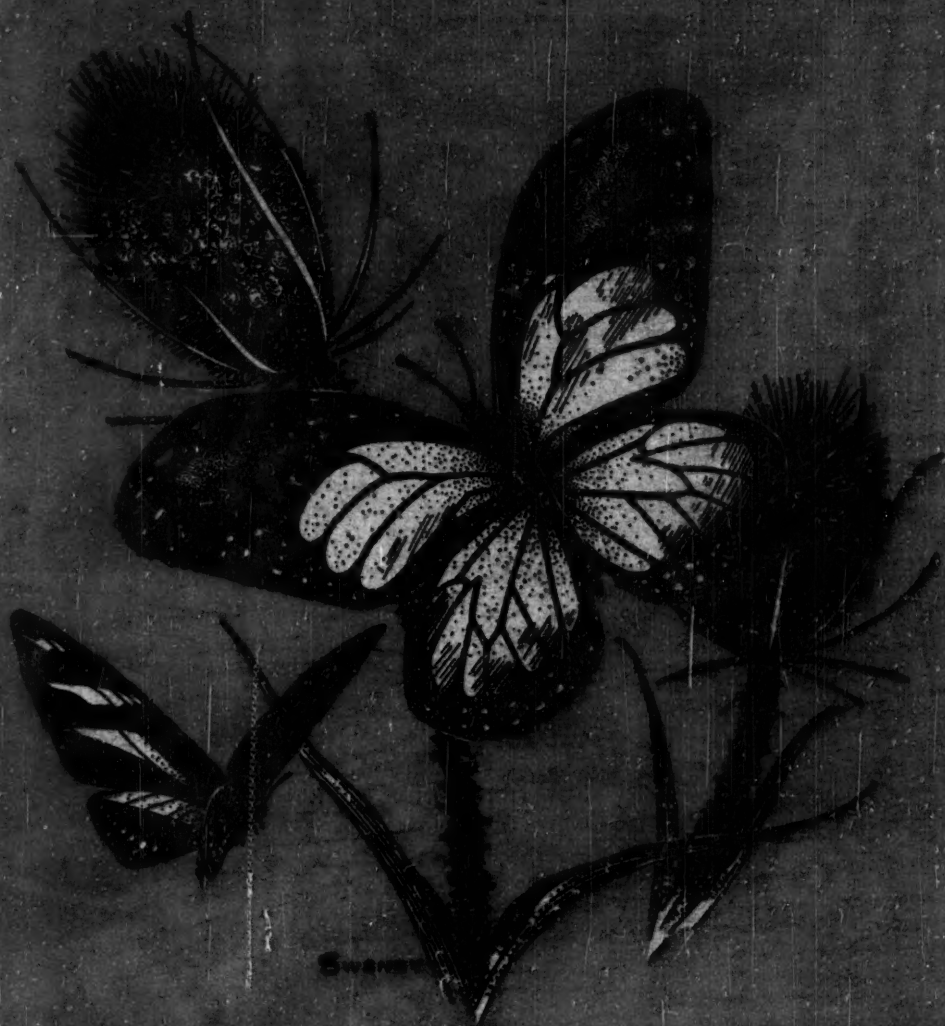


NATURE MAGAZINE



August-September, 1949

30 Cents

Vol. 67, No. 1

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35. *Getting Personal with Mountain Lions*: A thrilling picture of a pack trip into lion country.

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Farmer and Wildlife

The Farmer and Wildlife. By Durward L. Allen. Washington, D. C. 1949. The Wildlife Management Institute. 84 pages. Illustrated. Free on request.

This bulletin is designed to be a basic guide to wildlife management on the farms of the eastern United States. It seeks to aid the farmer by indicating such fundamentals of land management as are now known to contribute to the increase of farm wildlife. The author is a biologist on the staff of the Fish and Wildlife Service and he writes with authority about a field in which he has specialized. He points out that, basically, proper care of the land is the starting point. Study of wildlife management, a quite new science, has developed certain techniques calculated to increase wildlife populations on such land. These Dr. Allen treats with as fully as possible within the limits of this bulletin. The basic objective, of course, is to increase game bird and mammal populations for harvest by the farmer himself, or by hunters. However, the principles put forward can equally be applied by the farmer merely interested in increasing wildlife on his property for the inherent interest in the animals themselves.

Scientific Dictionary

Dictionary of Scientific Terms. By John H. Kenneth. Edinburgh, Scotland. 1949. Oliver and Boyd, Ltd. 4th edition, revised and enlarged. 480 pages. 32 shillings.

First published in 1920, this latest and enlarged edition of this dictionary covers the fields of botany, zoology, anatomy, cytology, physiology and embryology.

Birth of a Baby

A Baby is Born. By Milton I. Levine, M.D., and Jean H. Seligman. New York. 1949. Simon and Schuster. 54 pages. Illustrated by Eloise Wilkin. \$1.50.

This little book is jointly authored by a doctor and his wife, authorities in the field of child psychology and sex education. It has been tested by a group of children and approved, the publishers say, by representatives of Catholic, Protestant and Jewish clergy. The text is designed to answer questions asked by children from six to ten, and for reading either by the adult to the child, or by the child.

Yellowstone

Yellowstone National Park. By Hiram M. Chittenden. Stanford, California, 1949. Stanford University Press. Newly revised edition. 286 pages. Illustrated. \$3.50.

This book was originally published in 1895. General Chittenden knew the Yellowstone area intimately and was for two years concerned with road construction there. Thus the original publication of the book had great historical significance, which the newest edition still pre-

serves. To bring it up to date, even after editions in 1903, 1915 and 1918, General Chittenden's daughter, Eleanor Chittenden Cress, and Isabelle F. Story of the National Park Service have collaborated to supply corrections and additions, including the latest guide map to the park.

Demonstration Forest

The Charles Lathrop Pack Demonstration Forest. By Clifford H. Foster and Burt P. Kirkland. Washington, D. C. 1949. The Charles Lathrop Pack Forestry Foundation. 36 pages. Illustrated. Free.

Twenty years ago the late Charles Lathrop Pack gave to the New York State College of Forestry a tract of 2200 acres near Warrensburg, New York, as a demonstration forest area. Two decades ago management of such an area for its educational and research value, and to demonstrate good forestry practices, was still a pioneer idea. Now, after the passage of twenty years, it is possible to look back for a sufficiently long time to assess the value of application of such practices. This booklet, one of whose authors has continuously been associated with the forest since its establishment as a reservation, is an interesting and significant report of what can be done, and, therefore, a guide to others.

Border Lake Birds

"Birds of the Canadian Border Lakes" is the title of an interesting, informative and valuable leaflet written by Dr. W. J. Breckenridge, Director of the Minnesota Museum of Natural History, for The President's Quetico-Superior Committee. Preservation of the wilderness character of the Quetico-Superior carries with it preservation of this avian community in a natural state. Dr. Breckenridge explores, in this booklet, the significance of this bird life. Copies of the pamphlet are available from The American Nature Association on request.

Olympic Park Associates

In order to implement the on-the-ground battle for the protection of Olympic National Park the formal incorporation of Olympic Park Associates has been completed and individuals and organizations are invited to join. Individual membership is one dollar and organization membership five dollars. Memberships should be sent to John Osseward, Secretary-Treasurer, 5613 21st Avenue, S.W., Seattle 6, Washington.

Structural Geology

Principles of Structural Geology. By C. M. Nevin. New York. 1949. John Wiley and Sons. 4th Edition. 410 pages. Illustrated. \$6.00.

This is an expanded and entirely revised edition of this textbook devoted to the study of the earth's framework and the causes that are distorting it.



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Nature in Print

By HOWARD ZAHNISER

THE EDITOR—Philip Van Doren Stern—of a recently published anthology entitled *The Pocket Week End Book* points out in his introduction the interesting fact that the term "week end" was apparently first used only some eighty years ago. "It is so modern," he writes, "that the thirteen-volume Oxford English Dictionary, which ascribes dates to words as they first appear in the language, gives 1879 for 'week end.'"

Yet our highly organized, mechanized way of living has so endowed so many of us in America with so much freedom from labor—so much leisure, as we say—that the concept of the week end, and the term, are familiar indeed. So important, in fact, is this modern unit of time that the happiness of many, and their sense of satisfaction in living, depend to a great extent on what they do with their week ends. For some the unobligated time seems to hang heavy and leisure rhymes rather lightly with pleasure. Others have used their week ends rather earnestly, more concerned with satisfaction than with amusement.

Most appropriate of all week end arrangements, for urban and suburban dwellers, at least, are reasonably those that serve best to correct or balance the artificialities of the city living, which itself has made the modern week end possible. The person or family—which really is the smallest complete human unit, the natural compromise between the solitary and the gregarious,—that can contrive an annual vacation in natural surroundings and week ends of excursions into park or country areas in the long intervals between vacations has probably achieved as good a balance in living as modern conditions afford in the United States.

Lewis Gannett, who for seventeen years has written daily book reviews for the *New York Herald Tribune*, is among the extremely urban who have managed for themselves the extremely rural week end that a home of one's own in the country makes possible. Mr. Gannett has written an account of his rural experiences—*Cream Hill: Discoveries of a Week End Countryman*—that indeed makes it appear that he and his family are extremely fortunate. Ruth Gannett, his wife, has expressed her appreciation in ten lithographs that tell of her vital interest in the country and the things that grow there. Her interpretations of skunk cabbage and ostrich ferns are as lusty and beautiful as vegetation. In others she expresses the charm, the grace, the adornment, even the quaintness, of her week end surroundings. And one of her most engaging lithographs—like Mr. Gannett's accompanying text—depicts the "midget village" that young Ruthy built in the old barn out of packing cases, while Michael was carrying out a "tree-house enterprise centered in a big, wild black-cherry tree which grew out of an old stone wall."

On the back of the dust cover of *Cream Hill*, in large type, is a "blurb" so comprehensive, so concisely adequate, and so fair that it might well serve as a classic model for those who write the words for the jackets of books. It is as follows, in full: "More and more people, bound by necessity to the city, are seeking another way of life on week ends—the retreat to 'the place in the country.' Here is the delightful, discursive, and informal chronicle of one city man's Friday-to-Monday life on a Connecticut hilltop over the past twenty-five years."

In the midst of Mr. Gannett's topical and narrative chapters is one entitled "Cream Hill Calendar," in which, month-by-month, he describes succinctly and selectively the changes of the seasons as he observes them locally and as they affect him. It is one of the interesting features of this good-spirited, jaunty account of what Mr. Gannett in his terminal chapter calls his "Week End World." Sometimes, he says, "we . . . wonder if our week end world is really mere escapism." He is not sure. "What we are sure about," he concludes, "is that it works, and

that we love it."

From another Connecticut residence, "after years of exploring Nature both in the fields and marshes," Joseph Wood Krutch has written a volume of reflections, which he calls *The Twelve Seasons: A Perpetual Calendar for the Country*—a profoundly beautiful work, and one that is beautifully profound too. Of the snowflake he knows "the tiny point of coldness when it touches and the tiny point of wetness as it melts." So sensitive is he to the phenomena of Nature. Yet his concern is with significance, with what is perpetual, and with human destiny, although he guards against thinking more and more "in terms of abstractions, generalizations, and laws" and cherishes a participation in the experience of living in a world of sights, and sounds, and natural urges. *The Twelve Seasons* is a book to be enjoyed and pondered, and one suspects that it may be contemplated by readers during a long future. In form it is a dozen essays, yet, at the same time, a sort of perpetual discourse that ends where it begins (with Hyla in spring) and sends the reader of the last page once more to the first.

Mr. Krutch, too, is a New Yorker, yet for his life away from the city he has no compunctions of escapism. From it, on the contrary, he gains a consciousness of reality. Such escape as there is from what he perceives to be a mass error. "What we have to decide," he says, "is merely whether we shall choose to have our chief business with the obviously living or the obviously not living—and we have made the wrong choice." In another connection he observes that "whenever man forgets that man is an animal the result is always to make him less humane." Remembrance that we "belong to something more inclusive than ourselves" is a source of deep joy, and Mr. Krutch's writing of this is itself of a source of joy.

"Joy, interrupted now and again by pain and terminated ultimately by death, seems the normal course of life in Nature," Mr. Krutch reflects, while "anxiety and distress, interrupted occasionally by pleasure, is the normal course of man's existence." In the country he escapes this joylessness "to some degree," and also participates "somewhat in the joy which is not ordinarily ours."

It is with the grace of a pellucid style and the charm of gentle philosophizing, and not without wit and humor, that this book is written. There is much pleasure in the reading of it, yet its value seems greatest in its demonstration of the thesis that man is essentially a part of life—and in its various statements of the error in not recognizing this.

"What we have actually done as we have built cities and tended to lead more and more exclusively urban lives," Mr. Krutch expounds, "is not to turn toward either the God-who-is-not-Nature or the Man-who-is-not-Nature but to busy ourselves with that part of the natural world which is not alive rather than with that part which is. What we have tended to become is not either the Humanist or the Worshipper but quite simply the mechanic and the technologist. We have forgotten the beast and the flower not in order to remember either ourselves or God, but in order to forget everything except the machine."

One recalls Mr. Gannett's good-humored protesting that "the internal-combustion engine is not an old family friend to me; it is a necessary but mysterious and vaguely inimical stranger." He, at least, through his week end world, has kept (or achieved) a balanced view of the mechanical and animate worlds. One wonders how the new gift of our mechanized way of living which the week end is can be better used than to keep one's self in touch with the way of Nature. "From Nature," Mr. Krutch assures us, "we learn what we are a part of and how we may participate in the whole; we gain a perspective on ourselves which serves, not to set us aside from, but to put us in relation with, a complex scheme." From Mr. Krutch we can learn much too, and a first ensuing week end might well be spent with *The Twelve Seasons: A Perpetual Calendar for the Country*. (A typographically pleasing book it is, too, with distinction in its illustrations by Armin Landeck.

Cream Hill: Discoveries of a Week End Countryman, By Lewis Gannett. New York: The Viking Press, 1949. 191 pp.

with 10 lithographs by Ruth Gannett, including end-paper and cover illustrations, \$3.50.

The Twelve Seasons: A Perpetual Calendar for the Country. By Joseph Wood Krutch. New York: William Sloane Associates. 1949. 188 pp., with 15 illustrations by Armin Landeck. \$3.

Fresh Water Fishing

Fresh Water Fishing. By Arthur H. Carhart. New York. 1949. A. S. Barnes and Company. 237 pages. Illustrated with 18 color plates by Ellen Wagstaff and drawings by Hamilton Greene. \$5.00.

Art Carhart has wet his line in fishing waters just about all over the North American continent. And he has studied fishing and fishermen, writing extensively on the subject. Added to this, he is an ardent conservationist, with a deep love of the outdoors. It is natural, therefore, that this book should be more than just a fishing manual, with advice on how to pursue this activity. The advice is there in plenty, but it is presented against a background of why; with emphasis on the greater significance of association with the outdoors than just the results shown in the creel. We cannot imagine any fisherman failing to revel in this book, which is the perfect answer, incidentally, for a gift to an angling friend or relative. Nor can we imagine any fisherman reading it without gaining a clearer idea of why he finds pleasure in fishing, or should find greater enjoyment than merely hooking the fish. Technically, the book is a complete discussion of bait and fly casting, spinners, lures and equipment. The eighteen color plates show flies and plugs and spinners. This is a significant addition to "The Sportsman's Library" brought out by Barnes, and it cannot fail to be widely acclaimed by the followers of the immortal Izaak Walton. R.W.W.

Life of the Seashore

Beginner's Guide to Seashore Life. By Leon A. Hausman. New York. 1949. G. P. Putnam's Sons. 128 pages. Illustrated. \$2.00.

This is the most recent addition to Putnam's series of beginner's guides and it covers more than 250 of the more common forms of animal life, mainly invertebrates, found on the beaches and between tides of both of our coasts.

Monkey Friends

My Monkey Friends. By Mrs. Charles E. B. Russell. New York. 1949. The Macmillan Company. 127 pages. Illustrated. \$2.25.

Adopted monkeys have been a hobby with Mrs. Russell, and she acquired them as pets in various parts of the world. This is the story of her monkey friends of various species.

The Story of a Mink

Vison, The Mink. By John and Jean George. New York. 1949. E. P. Dutton and Company. 184 pages. Illustrated by Jean George. \$2.50.

This is the second Nature book by this husband and wife team, the first having been *Vulpes, The Red Fox*. It is a well-written and carefully accurate story of life of a wild mink and the other creatures of the wild with which it comes in contact. Mr. George holds degrees in wildlife management and zoology, is an ornithologist and naturalist, writing, therefore, out of an extensive field knowledge of the outdoors. Mrs. George has a background of writing experience and contributes, also, the effective illustrations. This is an excellent book for all outdoor lovers.

Forestry Directory

The Forestry Directory. Compiled by Tom Gill and Ellen C. Dowling. Washington, D. C. 1949. The American Tree Association, 1214 16th St. 420 pages. \$3.00.

Brought up to date factually and statistically, the 1949 edition of *The Forestry Directory* is the sixth in the series begun in 1924. The last previous edition was in 1943, so the progress in the field of forest conservation that has taken place during the past half-dozen years is reflected in this present book, and signalized by the great increases in appropriations for forestry purposes. Of this Randolph G. Pack, president of the American Tree Association, says: "It is an impressive record, and an encouraging sign of widespread acceptance of the basic importance of forests in our economy." The *Directory* is an invaluable reference work in the field of conservation. While most of the data relate to forestry on state, national and international levels, information about conservation organizations, state and national, is of special use. In fact, nothing that seems to relate to the forest conservation picture appears to have been overlooked.

Marine Animals

Natural History of Marine Animals. By C. E. MacGinitie and Nettie MacGinitie. New York. 1949. McGraw-Hill Book Company. 473 pages. Illustrated. \$6.00.

This is a textbook devoted to ocean life and environment. The first part of the book discusses the environmental aspects of the ocean in contrast to the conditions under which land animals exist. The second part of the volume is concerned with the marine animal kingdom by groups, starting with the simpler forms and proceeding to the more complex. The style of the text is as non-technical as the subject allows. The authors are both on the staff of the Kerckhoff Marine Laboratory of the California Institute of Technology.

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Devoted to the Practical Conservation of the Great Natural Resources of America

IN THIS ISSUE

August-September, 1949 Vol. 42, No. 7

Zebra and Monarch Butterflies	Fredric Sweeney	Cover
Nature in Print	Howard Zahniser	298
Contents Noted	R.W.W.	303
Squatters' Rights	Edmund J. Sawyer	305
Burbank Loved Mankind	John Y. Beaty	309
Stinkhorns Are Enticing	Louisa R. Gleason	312
Why I Am a Naturalist	Alan Devoe	313
Pollution Crusader	William Gilman	315
Our Swans Trumpet Good News	Grace V. Sharritt	316
Woodchuck Therapy	Robert Peel	319
Flaming Symbol (Poem)	Gerhard Friedrich	320
Fern Cave	Ruth E. Hapson	321
The Hermit's Departure (Poem)	Oscar Ostlund	323
High-Climbing Porky		323
Mice or Men	E. Laurence Palmer	324
The Jackson Hole Elk (Editorial)		328
Drums along the Atlantic	Romeo Mansueti	329
Green Relief (Poem)	Mae Winkler Goodman	330
Davidsen Hill—Duluth's Conservation Challenge	Raymond Naddy	331
Any Old Scrap?	Margaret Drake Elliott	332
August and September Heavens	Isabel M. Lewis	333
The Chickadee and I (Poem)	Charles Edgar Gilliam	334
Camera Trails	Edna Hoffman Evans	335
The School Page	E. Laurence Palmer	336
American Nature Study Society		338
Under the Microscope	Julian D. Corrington	342

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Headed West?

Hi, Stranger! by Arthur Carhart. Chicago. 1949. Ziff-Davis Publishing Company. 222 pages. Illustrated. \$3.00.

As the subtitle states, this is "the complete guide to dude ranches" in the West. Against a background of the country in which these ranches are located, Mr. Carhart has included advice on what to take along in the way of camping equipment, clothes—"Boots to Hats"—and much needed information on western horses, horsemanship, trail riding, and other valuable details that will help the "tenderfoot" fit more easily into ranch life. Sage comments from an old rancher enliven each chapter, and complete the friendly touch of the informal title.

New Bird Book

Birds, A Guide to the Most Familiar American Birds, by Herbert S. Zim and Ira N. Gabrielson. New York, 1949. Simon and Schuster. 157 pages. Illustrated. \$1.00.

Although we do not find any statement to this effect, the purpose of the book is evidently to serve the young or beginning student. The size of the book permits treatment, even mention, of a relatively small proportion of our species and subspecies. Only one loon is treated pictorially, one grebe, four herons, one grouse, six ducks, and so on. In each case the picture takes about two-thirds of the page, the remaining one-third being given over to an attempt to describe the appearance or some other characteristics of other related species. A map shows the ranges of some of these in the United States, but ignores any areas beyond our borders. To the trained ornithologist the range intended is understandable, but to the untrained individual the result must be puzzling, to say the least. In general the colors of the birds are satisfactory, but the book makers have had trouble with those wholly or partly blue, for the tints are sometimes too bright. In general, however, the results are good.

Perhaps because of the limitations of space for text, there are a few unfortunate statements, as under the great blue heron, which is credited with being our largest heron. Actually the Great White Florida Heron is the larger. The whip-poorwill is described as not flying much, even when feeding, although this bird subsists almost entirely on winged insects.

All in all, however, we would say that the book is well worth the one dollar charged.

E. A. P.

Queensland Birds

Ornithologists interested in birds of other lands will wish to have a compilation of the birds found in North Queensland. This check list has been assembled and published by the North Queensland Naturalists' Club, 253 Sheridan Street, Cairns, and is available for two shillings.

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BRITISH RAILWAYS

Fish and Wildlife Service

Recent releases from the United States Fish and Wildlife Service bring us a variety of information. The 1947 annual big-game inventory showed 7,758,900 animals in the United States, and the sport kill for 1947 was 891,200 animals. Wildlife Leaflet 321, entitled "Big-Game Inventory of the United States, 1947," gives details, and is available from the Division of Information, U. S. Fish and Wildlife Service, Washington 25, D. C. . . . David R. Gascoyne has been appointed director of Region 5 of the Service with headquarters in Boston. . . . Hunter take of wild ducks and geese during the 1948-49 migratory waterfowl shooting season is estimated by Director Albert M. Day of the Service as 17,000,000 for the United States and about 50,000 for Alaska. There was a 27 percent increase in the number of hunters and a kill of nearly 48 percent more than in 1947. It is also estimated that out of every six ducks brought down within sight of the hunter, one crippled duck was lost. . . . Shooting of mountain sheep in Alaska is forbidden by the 1949-50 Alaska Game Regulations to prevent extinction of already depleted herds.

Problems in Britain

The following paragraphs are quoted from a letter to Mrs. C. N. Edge from a conservationist friend in Essex, England, who writes:

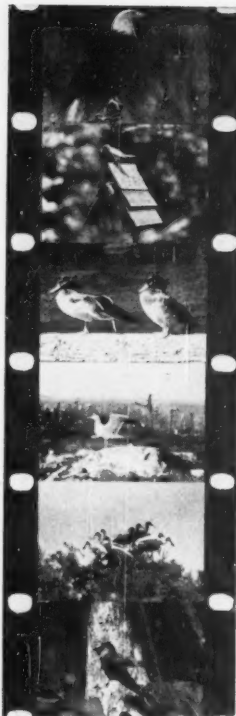
"Our great problem is the meat shortage. I expect you know that the ration goes steadily down, and is now 10d. worth of skin and bone of an unspecified frozen animal, per person per week.

"This means appalling slaughter of our wild life. Every kind of bird and beast is killed, against the law, by black marketeers, for the town restaurants, where it is served as 'game pie.'

"A tour round poulterers' shops is heartrending. I have seen owls hanging up in cheap shops. The law is rotten. Certain birds may not be killed, but there is nothing against them being sold. So one can do nothing. Also, the bird laws in Eire are practically non-existent, and the poulterer just says: 'That bird was imported from Eire.'

"Last year 10 out of over 1000 gulls' eggs were left on an island near here, a so-called 'sanctuary.' Terns, gulls, even moorhens are robbed wholesale and the eggs sold as 'plover.' Seals and badgers are killed to feed racing greyhounds, and for all I know, humans in restaurants, too.

"The irony of it all is that otherwise there has never been such interest in bird conservation as there is today. It has increased enormously since my childhood. The radio gives constant talks, bird protection is taught in the schools, and the spate of books published daily is vast. It is a tragedy."



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Contents Noted

THERE seems to be a gradual awakening to the fact that all is not well in the widespread use of DDT and other high-powered insecticides. The National Audubon Society reports conclusive evidence of rapid destruction of fishes and crustaceans, such as crabs; slower mortality among birds that have eaten poison-laden insects. *Business Week* reports a falling off in consumer demand for DDT, although makers of insecticides regard fears as hysterical. The Agricultural Research Administration of the U. S. Department of Agriculture—which, in our opinion, has been too complacent—is bestirring itself by way of investigation. It admits that bird loss has been caused in some cases of spraying with DDT dosages sufficient to check the insect carriers of Dutch elm disease and phloem necrosis, two deadly enemies of elm trees. How much damage will be done before we have either the regulations or the know-how to handle such lethal chemicals remains to be seen. We cannot, however, refrain from pointing out that *Nature Magazine*, in March, 1945, sounded a strong warning about DDT in a prophetic article by Edwin Way Teale. In an editorial we called for an attitude toward DDT that would strictly control its use, even when its potentialities are fully known. It was not controlled, and we now know it should have been.

FROM Gladys S. Smith of Boston comes a neatly printed sheet in which she points out that we had a symbol V to win the war, and suggests that we have a symbol D to win the peace. D, Miss Smith says, would stand "as a Defense against Soviet Russia; as Democracy in the U.S.A. and for the United Nations; as a Dream to be realized for Czechoslovakia, China, and subjugated peoples; as the Dawn of the New World." Miss Smith asks us to use the symbol D "to help us along the road to Democracy throughout the World." The peacetime finger symbol of D could be rendered, we suppose, with the left forefinger as the upright and the right thumb and forefinger as the rest of the D. Perhaps a symbol would be effective in achieving world peace, but only, we believe, if it reflects a deeper spiritual dedication to the cause of peace. The V of war days was, to us, a symbol of clanking tanks, roaring squadrons of bombers, the crash of artillery fire—in other words, the might of a war machine. It seems to us that, if the D symbol is going to get us anywhere, it must stand also for Devotion to peace, not the Destruction of warfare.

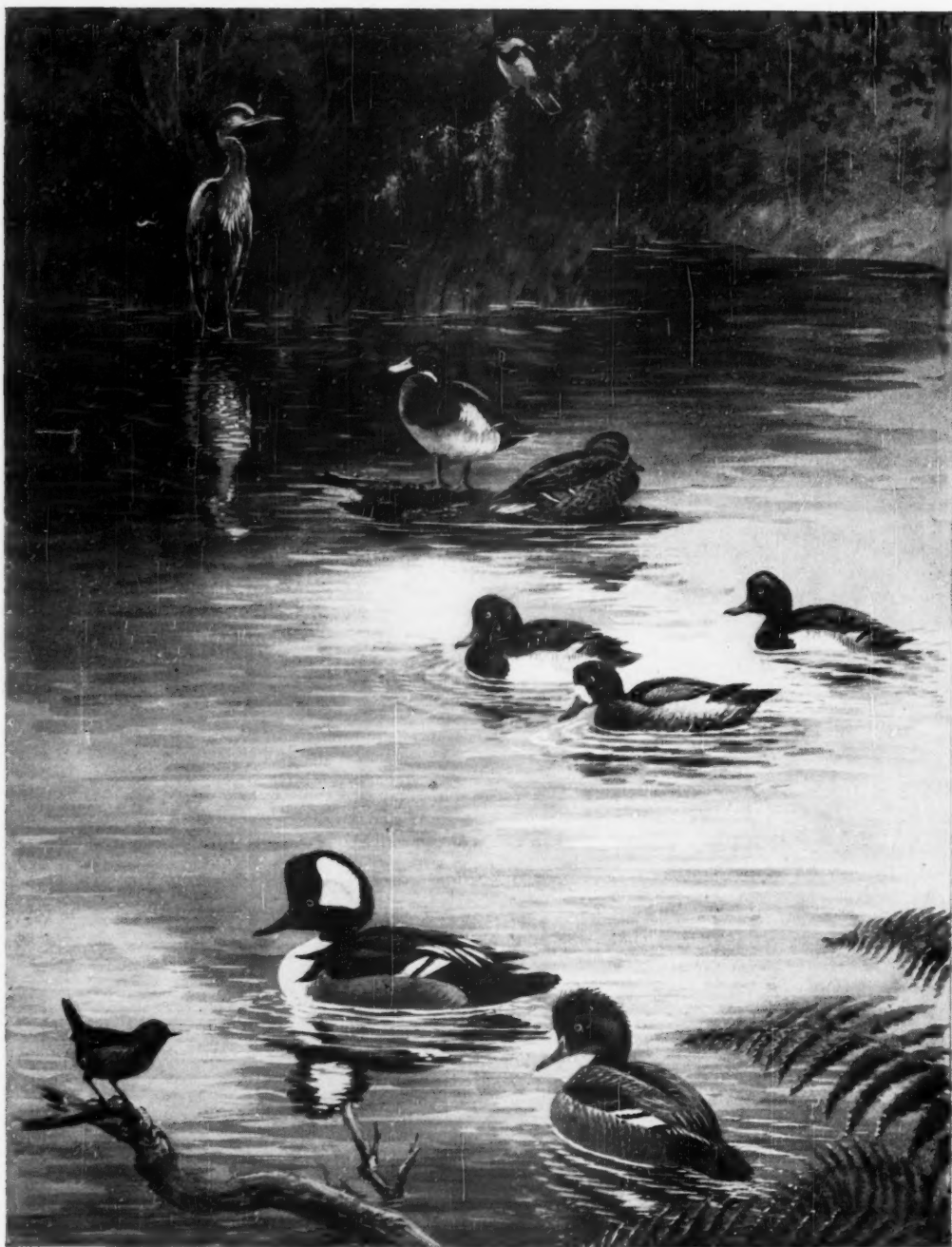
ALMOST in the same mail came an invitation to join the ranks of the American Feline Society, and a request from the Friends of the Birds to support the fight against the free-roaming cat in Illinois. Pro-cat is Robert Lothar Kendell, who calls upon all

lovers of America's 21,000,000 cats to adopt one of the 10,500,000 homeless, neglected and abused cats and thus solve the "surplus cat problem." Pro-bird is Gertrude Charny, who, almost single-handed, got a bill through the Illinois Legislature to require the restraining of cats, only to have the Governor veto the measure. If we were to take sides we would say that more than ten million cats living by their wits is more than ten million too many cats. And we might suggest that Mr. Kendell's National Cat Week from next November 6 to 12 include some educational emphasis on the cat-bird relationship.

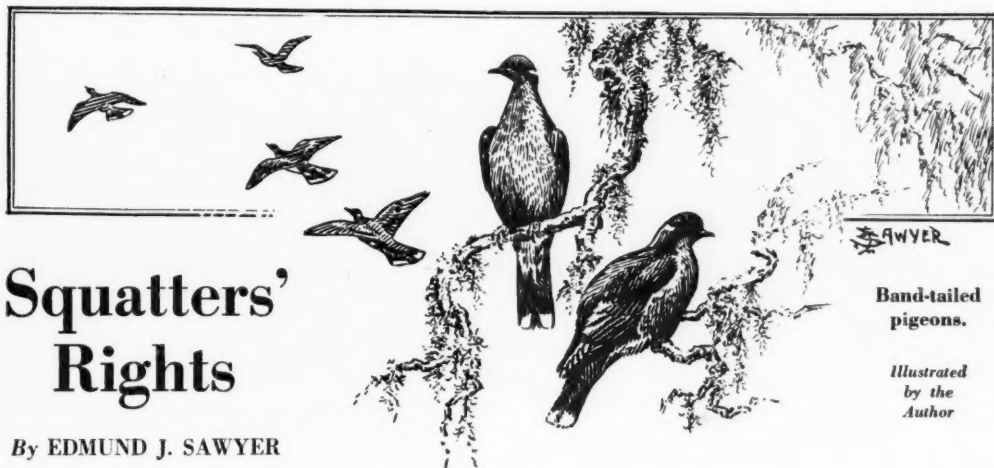
WE HAVE been taken to task for carrying an advertisement of sparrow traps. On the other hand, we have received numerous requests from bird-loving readers who have asked where they could get such a trap to reduce the local English sparrow population in the interest of other birds. Also we have been berated for even suggesting that the English sparrow is a nuisance. Such differences of opinion are typical of anything to do with wildlife. Those who object to the trap point out, with reason, that, for example, a female purple finch or indigo bunting, or a wintering white-throated sparrow may easily be taken for a female English sparrow by the uninformed. This is certainly true, but, perhaps too complacently, we have felt that our readers would know one bird from another, and that a sparrow-trap advertisement would save time and postage in answering inquiries. However, such advertising is carried in farm publications, and the use of the traps by uninformed readers undoubtedly results in the destruction of uncounted numbers of valuable birds. Bird banders will confirm the statement that fully as many white-throats and song sparrows get in their traps as do English sparrows. What should we do? Are we right in assuming that our readers are a wise and careful group to be trusted with a sparrow trap? Or should we campaign for laws against these traps everywhere, instead of in a handful of States?

FROM the *Whitehaven News* of Cumberland, England, comes a little story about a Mr. S. Hogarth, Penrith business man, who found a pair of robins building a nest in the dashboard "cubby hole" of his automobile. He removed the nest to a pleasing site, to him, in the garage. The robins went right back to rebuilding in the dashboard. So Mr. Hogarth let it go at that and drove off to work, robins, nest and all. The first egg was laid during such a trip; five finally. While the car was parked, and Mr. Hogarth busy at his duties—of all things as principal of an egg-packing station—the parent birds took trips awing. They were always back when it was time to drive home. The local constable provided police protection, for the successful bringing off of the young became a community concern.

R. W. W.



A typical group of birds on the pond at the Sawyers' Shangri La. From top to bottom, a kingfisher, a northwestern heron, two mallard ducks, three scaup ducks, a pair of hooded mergansers and a water ouzel.



Squatters' Rights

By EDMUND J. SAWYER

Band-tailed pigeons.

Illustrated by the Author

"STOP!" I exclaimed. This word of command, my wife and I had agreed, was to mean one of two things—a new bird or a possible studio-home site. This terse order was designed to halt our car and house-trailer quickly. This time it meant that I had glimpsed a flash of water through a small vista in the alders and willows on our right. Was this to be just another "pause in the day's occupation" of home-hunting, which, during three years, had taken us through New Hampshire, Vermont, New York, Florida, Oregon, Washington and six other states?

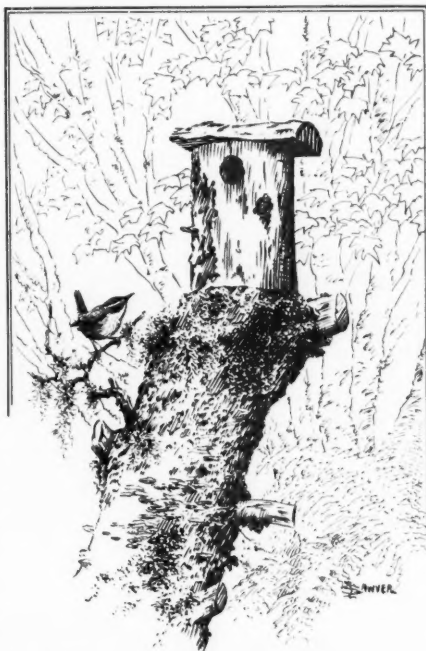
A minute later I was out of the car and breaking a path through shoulder-high ferns toward a fringe of alders. Just beyond these appeared the grassy border of a small stream. A stately heron rose with a loud squawk from the edge of the water, and a kingfisher rattled away downstream. A mallard flapped noisily across the surface in mock distress, a sure sign that ducklings were hidden nearby. A russet-backed thrush, singing, drew attention to a densely wooded mountain, its foot at the water's edge only a hundred yards farther along the stream. In the dead top of a giant fir a troop of eight or ten band-tailed pigeons roosted. The exciting, loud

call of a pileated woodpecker added a final touch. I hurried back to the car to announce that our quest was over, our home-to-be was found, at long last.

It was not alone the wildlife I had seen and heard—perhaps not even mainly—that, in two short minutes, had made the spot irresistible. With water, land, vegetation and a certain picturesque wildness, this spot had "that look," which no one can describe

and only a seasoned bird-lover would appreciate. The place fairly breathed and radiated exciting promise. That promise was to be more than fulfilled.

No one was living on the farm, of which the portion we coveted formed a small part. At the nearest occupied house, however, we were told the owner's name and address. Also we were assured that the entire farm might be bought, but would certainly not be parcelled. Nevertheless, we sought the owner in Bellingham, Washington, some twenty-five miles distant. He seemed to have forgotten the particularly unproductive and "useless" spot, which, alone of his eighty acres, we wanted. Did we actually wish to live there? Yes. What did we expect to raise? Nothing. Did we have any visible means of support? No. How would we make a living? Well . . . but . . . did he not realize that



A Seattle wren surveys the home-site provided as a gesture of welcome.



The wood duck left her nest and flew down stream and out of sight.

we were Nature lovers, hence not concerned with such a prosaic question? I saw a shrewd glint come into the eyes of our prospective landlord. Nature lovers! He had heard of the breed, and now here were two specimens before him in the flesh. He looked us over as if searching for some mark of our kind, or, perhaps, for tails or hoofs. However, he made us an offer—eight acres, which would include the headwaters of the stream and land on both sides. So here we are.

To those with the same objective, and as naive as we were at the start, we would advise them not to be too much disheartened when, and if, realtors and local newspaper advertising fail. It is amazing what sort of areas others conceive to be "just what you want." Your own most careful and detailed descriptions generally count for nothing. From our own rather long, and certainly widespread and varied experiences, one rule emerges crystal clear: Go places; cover ground; spend gasoline; exercise leg muscle; period. If you must listen to leads offered by others, first make sure they really grasp "that certain intangible something" you require.

There is no royal road to your Shangri La. Implied in the very terms that best describe it, it is apt to be hidden away from the ken of realtors, unsuspected by the general public, neglected and

practically forgotten—if ever known—by its very owner.

Yet it is golden to you. But gold is where you find it; usually after diligent and weary searching, if at all. But the search is bound to have incidental rewards. In the process you cannot escape gathering wildlife lore, along with burrs and bruises. You will even meet wild creatures on a mission similar to yours, but in their own behalf. For instance, I have, from time to time, watched some bird trying out a nesting place for size and immediate surroundings, making repeated trips to and from a given spot before deciding to fetch and lay the first straw or twig for her nest. We followed out that hint, and, in the end, it paid us to have done so.

For the first six months my wife and I, with our cocker spaniel, Chinky, lived on our property in our trailer. Close beside the trailer I began to build our studio-cabin home, into which we moved before the first winter was over. A hundred and fifty feet from the creek, which here widens into a pond, stands our house. There, of course, all the sawing and hammering was done. Yet, with all the din, dipping our water from the pond, and hanging out washing, the wild ducks already on the pond continued there. Before winter was over their number increased to seven species, and more than ninety individuals at a time. Deer, not seen at all for the first week or two,

became nearly daily visitors to the pond, and elsewhere within a stone's throw of the dwelling, during the weeks following. With the house still unfinished, and with many incidental distractions, we had no opportunity to attempt anything like a complete check-up on the wildlife. What we saw was virtually unavoidable.

On many a day it was a couple of deer, drinking or feeding along the edge of the pond a few feet away as we looked up from the breakfast table. Again, it was a new water bird—a coot, phalarope or grebe—among the usual ducks. One day a bald eagle appeared, to remain beside the pond for a week, maneuvering in vain for a duck dinner of our waterfowl.



Varied thrushes were among the birds that took up residence near the house.

A flock of band-tailed pigeons would sweep past. A rufous hummingbird took to hovering before the printed flowers on our curtains. Repeatedly, a winter wren entered the house and had to be shown the way out. In our first summer we found thirteen species of birds nesting within a hundred yards of the house. A western flycatcher and a red-eyed vireo built in the vine maple whose branches brushed the back of our rear porch roof. Of a total of about seventy-eight species of common, or fairly regular, local birds, we have found sixty-one on our acres. Of some twenty-five mammals supposed to occur regularly in the region, we have heard or seen thirteen on our premises.

The birds fall into two categories—old friends and new. It brought a peculiar thrill to see here, on our own ground, close and alive for the first time, such typically western species as the band-tailed pigeon, red-breasted sapsucker, chestnut-backed chickadee and varied thrush. There was an equal, although different, pleasure in finding as fellow tenants such old friends as the yellow warbler, red-eyed vireo, killdeer plover, spotted sandpiper, golden-crowned kinglet, goldfinch, and song sparrow. Some of these carry added geographical names, but, in song, call notes, habits and manners, are familiar wherever found. The feeling is that of running across old neighbors in a foreign land.

Seeing a mink about the pond for several days, and fearing he would catch one of our resident muskrats, or a duck, I hastily made and set a crude box-trap. He was soon caught, but not before the trap had captured, and been freed of, a spotted skunk and a Douglas squirrel. Another visitor caused the mysterious disappearance of several mouse traps, until I finally saw the thief lugging one of the traps over a rock slide beside the pond. It was a packrat. Digging a well within fifty feet of the house, I had reached a depth of five feet when a mountain beaver neatly ran his own horizontal tunnel into the hole, producing a sizable mound of earth for me to shovel out. A curious, all-green tree frog, of a species new to me, fell into that hole and meekly allowed himself to be lifted out. Bats of two species—one small, the other remarkably large—are numerous. A large lizard lives in my shingle pile, moving from bundle to bundle only as the pile diminishes with continuing carpentry.

So runs the roster of our cosmopolitan tenants. Numerous small snakes, all harmless, wriggle from the open foundation of our house to take daily sun baths, the weather allowing. White-footed mice, not too unwelcome, share our kitchen at times, while jumping mice remain for the most part just outside. One of the latter was once rescued from Chinky before he



The winter wren and its cozy nest.

could harm it. Black bears are passers-through, as attested by unmistakable signs. Cougars and bobcats are undoubtedly occasional, if unseen, trespassers. Both are well known to occur as nomadic and unpredictable visitors. Picas or conies—locally called rock rabbits—live in our rock slide, their peculiar bleating, almost the negation of a call, reaching to our door.

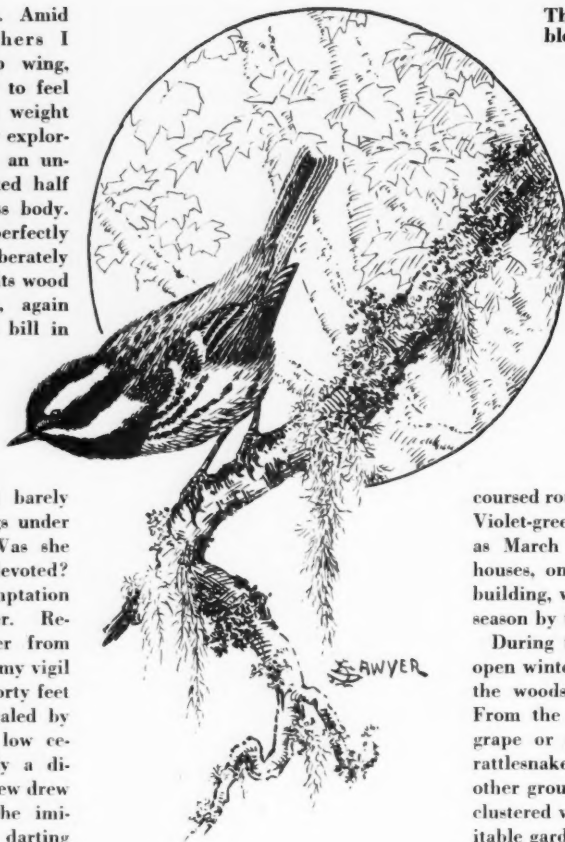
Almost any evening we can see a solitary old beaver on the pond. His house is built half in and half out of the water. At least one muskrat shares the old beaver's lodge. The latter reaches to the very base of a large fir tree. Since there is occasion for me to climb that particular tree from time to time, I must, in so doing, plant the base of my ladder among the very foundation sticks of the beaver lodge. Some fourteen feet up and against the trunk of the fir tree is "Wood Duck Manor"—an artificial "hollow tree" type nesting box, which was discovered and used by wood ducks the first season I placed it there.

Last year, after a winter spent in town, I was a little late inspecting the duck's box. After much thumping on it with a long pole, no sign of life emerged. Putting up the ladder, I climbed up and

gingerly felt inside. Amid a mass of feathers I touched one limp wing, pulled it up, only to feel it fall of its own weight when released. My exploring hand touched an unresisting bill, tucked half under a motionless body. Pulling up the perfectly limp head, I deliberately felt each detail of its wood duck-like contour, again twisting the small bill in my fingers to determine its exact shape. Then I let the head drop, which it did, stone-like. I had barely felt a layer of eggs under the still body. Was she dead or merely devoted? I felt no great temptation to intrude further. Removing my ladder from the tree, I took up my vigil on a mossy bank forty feet away, fairly concealed by vine maples and low cedars. Momentarily a diminutive water shrew drew my attention as he imitated a water bug, darting about on the surface of the pond close to the bank and not six yards from my feet. He lives in that bank. Half an hour passed, and then the darkness of the doorway on the fir tree was suddenly replaced by the head and breast of an emerging wood duck! Only a few seconds did she pause before silently flying out over the water and down stream out of sight. I continued to wait and watch until, some twenty minutes later, she returned by the same route and entered the box without a pause. In the days following I repeatedly watched her in the same routine. When I felt sure she had finally brought off her brood I again inspected the nest, and, sure enough, only empty egg shells remained.

The fortunes of another wood duck box, placed in a large vine maple somewhat nearer the cabin, were different. This house was promptly claimed by a flying squirrel, who produced in it a litter of five, their eyes not yet opened when I first looked in on them.

Daily throughout April and May the muffled drumming of ruffed grouse, so fraught with the brooding mysteries of the age-old woods, is a spellbinding accompaniment to every breakfast, lunch and supper.



The black-throated gray warbler was one of the warbler visitors.

The drummer may be in any direction. Often two or more drum at once, each performing in his own secluded nook.

So mild is the climate with us that song sparrows, Oregon towhees, Bewick's wrens and robins, blue herons and kingfishers are common, year-round residents. I flushed a Wilson's snipe at the edge of our pond on January 25. On the mild mid-afternoon of February 1 a large bat

coursed round and about over the house. Violet-green swallows appeared as early as March 15. The two built-in bird houses, one on each end of our little building, were both taken the very first season by these birds.

During the long summers and mild, open winters, the perpetual greenery of the woods extends to our back door. From the carpet of evergreen Oregon grape or ground holly, ferns, mosses, rattlesnake plantain, and numerous other ground plants no less green, grow clustered vine maples, each trunk a veritable garden of lichens. Fir, spruce and cedar intermingle to complete the prevailing forest cover. And here one little bird, beyond any other, gives, in inverse ratio to his size, a characteristic touch of life. This feathered mite in sober chocolate-brown is one you would least expect to play such a role. For the western winter wren, individually, appears an exact duplicate of his eastern namesake—that rather shy and solitary elf that comes to the wooded lowlands only for the winter. Here the winter wren is permanently resident. Numerous in the woods all about, several of his kind haunt our premises, creep about and under the foundations of the house, investigate every block in our wood pile, even enter the house. Last summer I found a nest, a deep snug pocket of felt-like texture formed in a growth of moss that hung from a branch six feet off the ground. It was one of the most picturesque nests I have ever seen.

Thus our dream of owning some small portion of the earth turns out to have been something of a dream after all. In a sense we might as well have sought to own a place on the moon. "Bought and paid for"—what a myth! Day by day we learn how partial is our ownership. We forcibly (Continued on page 325)

Burbank Loved Mankind

By JOHN Y. BEATY

Luther Burbank peers at a bed of seedling cactuses, looking for fast-growing specimens.



LUTHER Burbank was born on a farm near Lancaster, Massachusetts, March 7, 1849—one hundred years ago. During his lifetime of seventy-seven years, he introduced more new kinds of plants than has any other man before or since.

Burbank's introductions totaled more than six hundred, including one hundred and thirteen varieties of plums, and several varieties each of apples, pears, quinces, grapes, plums, walnuts, blackberries, raspberries, strawberries, potatoes, asparagus, rhubarb, peas, roses, gladioluses, dahlias, zinnias, callas, daisies, tigridias and many, many more. Timber, nut and fruit trees, and shrubs, were included in his wizardry.

Today, seventy-four years after its introduction, the Burbank Potato—his first important contribution—is still grown in the northwestern states on a large scale. Thousands of carloads of these large, beautiful, nutritious tubers are shipped every year.

In 1945, the Agricultural Experiment Station of the State of California reported that there were a "total of 24,000 acres of Burbank varieties of plums

growing in California." Thousands of carloads of these fruits are shipped annually and the money returns run into millions of dollars—not a bad showing for the industry of one man.

There would be no Shasta daisy if it had not been for Luther Burbank. You will find this plant offered in most seed catalogs, for the most part, however, without mention of the fact that Luther Burbank produced this race of large, pure-white daisies by a long series of crossings. It is the policy of seedsmen frequently to introduce new varieties, the public liking "something new." For this reason, Burbank's name is usually not mentioned, since it would "date" the offering.

I had the rare privilege of living and working with Luther Burbank for several years, beginning in 1911. I was a young man at the time, and I am sure that Burbank's life principles, his example and influence, greatly affected my own life. He was a man you could not help but love, largely because he had himself a deep love for all mankind. The driving force behind all of his work was his desire to benefit all who lived after him.

Coupled with this high principle was an unswerving devotion to the work he had chosen. A boyish enthusiasm was maintained all through his life.

He was sixty-three years old when he came into my room one day, and, almost in a shout, announced: "Beaty, I have it at last! It is superb! It is delicious! It is wonderful! It is just what I've been expecting! Now I have found it! It is growing along the west fence over at my Sebastopol place."



Luther Burbank's home in Santa Rosa, California.

This is a Royal Walnut tree, a Burbank hybrid of a Persian walnut and a native black walnut. It is growing on the Burbank grounds at Santa Rosa.

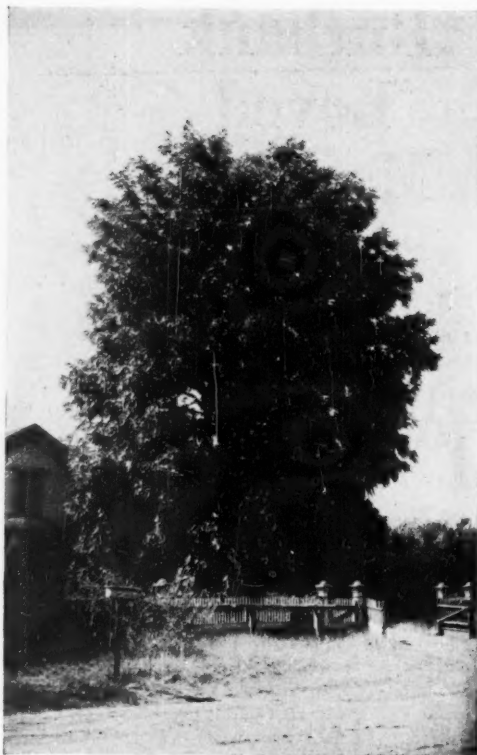
When he stopped for breath, I asked, "Mr. Burbank, what *have* you found?"

"A thornless blackberry," he said. "There isn't a sign of a thorn anywhere on the bush. You could rub any one of the canes on a baby's face without any danger of scratching. And the berries are delicious! They have the flavor I've been working for!"

"But," I said, "you have had thornless blackberries right here in Santa Rosa ever since I've been with you."

"Yes, I know, Beaty, but the fruits on those thornless bushes are insipid. The flavor is undesirable. There are no thorns on the bushes, but I must have a berry that people will enjoy. It must be of a delightful flavor. And now I have found it!"

Naturally, it was necessary, in creating so many new and unusual varieties of plants, for Luther Burbank to have an active imagination. He often said to me: "Before you can develop a new kind of plant, you must *imagine* the kind of plant you want. You must have a purpose. Nature has a purpose in everything that grows. If we want to grow something that will be better, we must have a purpose. We must know what we want. I am sure that, when we *know* what we want, we can find it if we are patient enough."



Certainly that bit of philosophy, which, at the time he put it into words, he was applying to his work with plants, is an ideal philosophy for all life, no matter what our work may be. I, at least, have found it a personal inspiration.

Luther Burbank had imagined not only a blackberry without thorns, but one with delicious fruits. That is just what he found. On another occasion, he imagined a blackberry with white fruits, and he eventually found white blackberries on some of the bushes in his experimental grounds. As a boy, he had imagined a large, white daisy. When I was with him, he had large, white daisies. He had named them "Shasta" daisies for snow-capped Mt. Shasta in northern California. He imagined a cactus without thorns, one that would grow so rapidly that it would become a useful forage plant. He produced many fast-growing varieties of spineless cactus.

It may seem difficult to harmonize the unbounded enthusiasm of Luther Burbank with his unlimited patience. If he had not been a patient man, however, many of the plants from which we now benefit would not have been brought into being. It took many years to develop the Shasta daisy, and many of his other

This is an early-bearing chestnut tree developed by Luther Burbank. This seedling was bearing at six months.

products. In some cases he worked patiently for decades, and still did not discover the kind of plant he had imagined.

Suppose you were to plant ten thousand seeds from which you hoped to get at least one new, useful variety. Suppose all of the seedlings turned out to be entirely useless, of less value than the plants we already have. Could you, then, be patient enough to plant another hundred thousand seedlings; and another, and another, and another, year after year, with disappointment every season? The patience of Luther Burbank made it possible for him to do this very thing.

While it is difficult to say that one Burbank characteristic was more important than another, I believe that his willingness to discard useless plants was even more important than his imagination. If you could walk through his testing grounds, as I did many, many times, following him as he was making selections, you would be astonished to see the large, juicy, beautiful plums, or the delightful new varieties of *Gladiolus* that he discarded.

I asked him one day, as we were going through his plum orchard, how many new varieties were grafted on the many plum trees there.

"About thirty thousand," he replied.

Burbank's habit was to graft new seedling fruit trees on old trees so that the fruit would appear much more quickly than if he allowed the seedlings to grow to maturity. He had five hundred new varieties of apples growing on one tree. As soon as a fruit tree, growing from a seed, was large enough to provide wood for a scion, he would cut off a twig and graft it on one of his older trees. Usually, the next season, or at the latest the second season, this grafted twig would bear fruit, and he could then see whether the new variety was promising or not.

As the plant magician came to a tree on which were grafted thirty to sixty new varieties of plums, he would pick a fruit that appeared to be ripe and bite into it to taste its flavor. Then he would pick another and hand it to me. I must confess that they all tasted good to me.

I would frequently say: "Mr. Burbank, this is a beautiful plum. It has a fine flavor. Aren't you going to introduce it?"

"No," he often said. "Look at the branch on which that plum grew. It hasn't the hardiness required in a commercial orchard." Or, "See the thorns on that branch. No one wants a tree with thorns." Or, perhaps, the plum did not have as good a flavor as he wanted.

There were many reasons why he tied a manila string around a scion to indicate that the new variety was to be discarded when it was time to graft another seedling onto the same branch.

One day, I was with him on one of his inspection trips through his grape arbor. Each grapevine was bearing a new variety of grape. I am sure that I



Luther Burbank, 1849-1926.

never saw such huge bunches with such large individual fruits.

"Surely," I said pointing to one vine, "this variety is ready for introduction."

"No," said Mr. Burbank, "that will be destroyed. It shows signs of being susceptible to disease and insect injury. Everything I introduce must be hardy. Hardiness is the most important characteristic in any cultivated plant. If it isn't hardy, if it cannot withstand the vicissitudes under which it must live, it shall never leave my hands."

This willingness to discard every new variety, no matter how attractive, if it showed even one undesirable character, was the basis for the excellence of those varieties that he did introduce.

One day, as we were walking through an acre of gladiolus, each one of a new variety, I asked: "Mr. Burbank, I wonder if your senses are not more keen than mine, and more keen than the senses of most people. You seem to be able quickly to distinguish between shades of colors. You seem to be able to smell odors that I don't notice. Your sense of taste when you bite into a new variety of plum is certainly better educated than mine. Is it likely that, because you use your senses more, they are more keen than the senses of other people?"

In reply, he told me of (Continued on page 340)

STINKHORNS are enticing, if you consider them from the right point of view. At least, one stinkhorn mushroom enticed me and, later, the bugs, making what proved to be a red-letter day as recorded in my field notebook.

The day was in early August, and distinguished by an evil odor brought by a brisk breeze from the west. The first whiff made me put down my bird glasses; the second whiff aroused the sleeping wrath of my conservationist's heart. Some rabbit, wounded (out-of-season hunter lurk in the woods across the section-line fence), had sought my wildlife refuge only to die.

The wind was heavy with the offending odor, and my nose pointed directly into the wind. My Irish setter companion never pointed a covey of quail more surely than I nosed that maddening smell. I circled the garage to the right, lost the scent, backtracked off to the left and picked it up again. There was nothing elusive about that odor, and, presently, I was in the very center of it. It enveloped me. I was saturated with it, but where did it begin? No dead animal was in sight, nothing unusual close by, and then, at my feet, a queer black hole in the ground was giving off a stench out of all proportion to its size. My conservationist's wrath gave way to my naturalist's curiosity, and I knelt down, carefully to windward, for a more intimate view.

The hole was in the top of a small, low, rounded structure protruding from the ground like a dome on a building. The dome was dark olive-green in color and the edge of the half-inch hole was white and rolled back, making a trim, neat finish. The entire odd growth had a dry, dull appearance.

The place was the site of an old woodpile, and the ground-cover was a thick pad of rotting sawdust and bits of bark, mostly from the cutting of oak and maple branches. An early morning thunderstorm had soaked the woody refuse thoroughly and a 72-degree



Stinkhorns Are Enticing

By LOUISA R. GLEASON

temperature was coaxing on the venturing mushroom. That was about nine o'clock.

By half-past eleven, that same morning, the mushroom was five and a half inches tall and had been identified as *Dictyophora duplicata*. The dark dome had become a wet and sticky, bell-shaped cap atop a white column of coarsely woven threads. Below the edge of the cap hung a frill of white net.

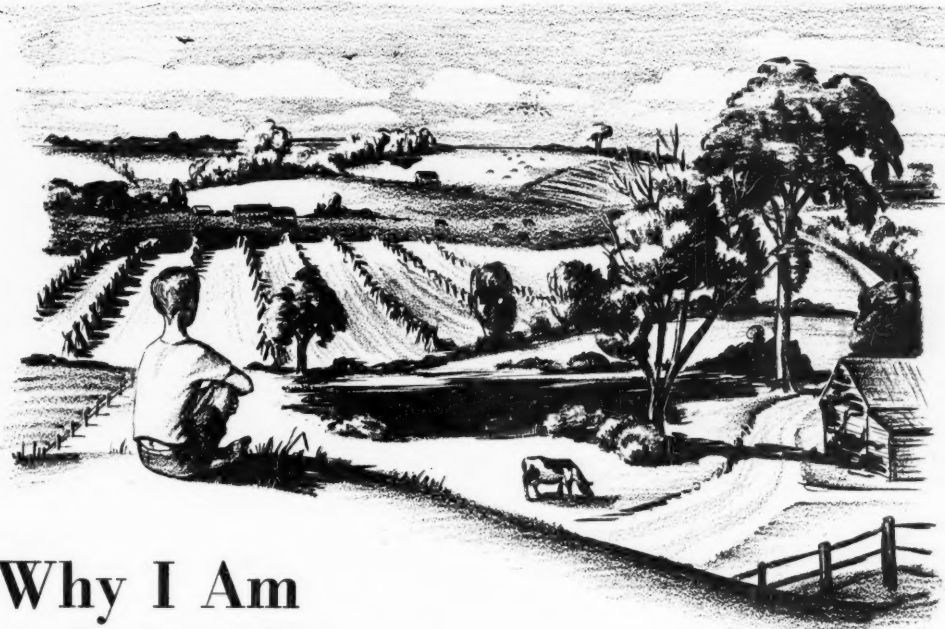
About one o'clock the dark, sticky, outside coating was beginning to slip, and two hours later it had gone, leaving a cream-colored cap, strongly and irregularly pitted and seamed. The frill was as stiff and delicate in pattern as Dresden china lace. Surely the Sage of Ecclesiastes knew whereof he spoke:—"He hath made everything beautiful in His time." The stinkhorn's beauty is stressed in its scientific name, derived from two Greek words, *dictyon*, a net, and *phoros*, bearer—the net-bearer.

The obnoxious odor is both a protection and a lure. All day long various types of in-

sects were gathering. Little flies, big flies, middle-sized flies and beetles were hovering about, alighting and wandering over the surface of the cap, or crawling into and out of the hole. In exchange for food and a place in which to lay their eggs the insects picked up stinkhorn spores and carried them to fresh breeding grounds.

With the setting of the sun, the lace frill had become a tattered rag clinging to the still white, stocky stem. The flies were gone, but there were three inch-long dark beetles with white shoulder plates wallowing and digging busily in the thick liquid within the cap, stirring up a continuous evil odor.

During the night, the stinkhorn's mission in life was accomplished. Nine o'clock the next morning found it a bedraggled, leaning stem deserted by its insect visitors, and the hot sun soon crumpled and withered it to become a part of the sawdust pile whence it came. Yet it had lived fully its brief hour.



Why I Am A Naturalist

Illustrated by Katherine L. Howe

By ALAN DEVOE

WHEN I was a boy of grammar-school age it seemed to me that there could be nothing in the world more pleasurable to do than just to sit in a meadow in the summer sun. It seemed to me that there could be no livelier delights than going bird-nesting in spring, going cocoon-gathering on crackling days in winter, going sugaring for moths in the long, late twilights of the summer. It seemed to me that this world, just as it was, and my own sharp senses and responses to it, just as *they* were, combined to make the life-adventure a glorious thing of splendid daily excitements and continuous rewards.

I should not at the time, of course, have thought of formulating it in this windy way. Words are for later years. Boyhood is for the living. But the view was there, unformulated, just experienced.

That is the way I felt and looked at things as a small boy. There was nothing extraordinary about it. It is the way most boys feel, and the reason why they are likely to dismay their elders by keeping grass-snakes in their pockets, or by attaching enormous significance to a "treasure" in the form of a queer-shaped stone, or by emitting a wild whoop and rushing out and rolling on the grass, when the soft airs of May are blowing and the sun shines bright. It is the way old Adam himself, the original boy of our tribe, may be supposed to have felt and looked at things,

back in the earliest dawn-day of the adventure of human consciousness. If there is anything at all unusual about the boy-convictions and boy-enthusiasms that once made up my life-view long ago, it is only the fact that they still do.

That is probably the shortest way, I imagine, of answering the question that is asked me every now and then, and that accordingly I have been asking myself, Why are you a naturalist? Well, that is why.

In my fortieth year I still think, as I did in my tenth, that just hearing and seeing the first spring bluebird, on one of those damp, earth-smelling March mornings when the mourning-cloak butterflies are flitting in the snow-patched woods, is a much more tremendous experience than anything that can be bought. I still think that just lazing away a hot afternoon lying on a hilltop and listening to the wind is a much better way of spending it than in a furious concentration on any of the myriad projects by which "practical-minded" people are constantly endeavoring to get the world to go faster, louder, more complexly and more profitably. I still think that the smell of hemlock boughs, or pond scum, or newly laid thrush-eggs, or a plowed field, or any woods at night, are infinitely more exciting and restoring than anything that comes by the costly half-ounce in a bottle. I still think certain moss-streaked and brook-



washed stones are very much treasures; and if I do not have a grasssnake about me at the moment it is only because I am writing in the winter.

The world, the natural world, looks very good to me, and tastes good and smells good and has a very good feel in all its textures of bark and blossom and feathers and fur and plain dark dirt. And man, the natural man, the original one, looks very good to me too, with his keenly subtle senses, his aware alertness and his joy in relaxation, his endurance and his exuberation and his glad response to living. The freshness of the morning of the world, and the freshness of the boyhood of the race . . . that is the way I want them; and I would not see the first traded for the murky skies and poisoned rivers of the biggest Progress procurable, nor the second traded for all the sophistication in all the libraries of philosophy.

(Words, did I say, are for later life? How they do pile up and tumble forth and get to be too many and too "wordy"!)

If the devotions of a man's heart are the sort I have been talking about, what is to become of him when he grows up? Factory directors do not get much chance for hearing the peepers in the spring marsh, or even for watching the cumulus clouds sail by. There is gold to be had in Wall Street, but no goldenrod, no goldfinches. And so . . . ?

Well, with one kind of mind, it is possible to become a clergyman. There is a great deal of Nature-closeness in Christianity, if you go digging down under all the ecclesiastical flummery; there is a lot of precious stuff about lilies of the field, and little foxes, and conies and threshing-time and so on. After all, the story starts, rightly enough, with man set down in a Garden; and it winds up with his being saved from his exile, and restored spiritually to that Garden, by One who was not a pompous dignitary nor a laborious philosopher but a carpentering countryman. A clergyman can find in his Gospel a plenty of good reasons for getting out under the sky, and for thinking bullfrogs are more exciting than bond-issues. Still, though, it takes a special turn of vocation to be a clergyman.

Just so, it takes a special twist of talent to be an artist. I had an uncle, when I was a boy, who was a painter. At least, when he vanished into the outdoors he had canvases and brushes and things in a knapsack; and when he came home again he would have pictures to show—sketches of a country creek, winding among sun-dappled alders, paintings of an old red barn with swallows flying around it and the cattle coming home. The pictures may or may not have had much merit; I do not know. But they served *his* purpose; they let him go scuffling through the autumn

leaves, listening to the white-throats; they let him go tramping through the blue-whiteness of the snow, breathing balsam-scent and hearing the tinkle of chickadees; they let him spend his life doing things like this, and responding to them with a spiritual and sensory eagerness that is the birthright of boyhood and that he wanted never to surrender. He never did.

If not a minister, not an artist, what? Well, there is the life, and a very luring one it can be, of a plain tramp. No money, no possessions, no responsibility, none of that murderous thing called one's "dignity" to be forever guarding . . . all these freedoms should release a man almost completely for the exercise of his cherished enjoyments; just hearing and touching and smelling and exulting in the wonder of the world. But it does not work out. It cuts a man off altogether from acceptance by his fellows; and we are a social animal. More, it cuts him off from a marriage, from a home; it thwarts the deep drives of domesticity. A fox has its earth. Even a male red-winged blackbird, singing *conkerree!* in the April swamp, is staking out a territory. We are not different.



If you are not to become an Eden-dreaming minister or an artist or a hobo—and if still you think with a high passion, just as you did at the age of ten, that the blossoming of spring bloodroot is bigger news than anything in the day's newspaper, and that the scream of a high hawk, wheeling in the wilderness places, is a finer thing to hear than the scream of a factory whistle—if you feel and think like this, what do you become? Why, what you become, of course, is a naturalist. In a very real sense, indeed, you already *are* a naturalist. Your deepest spirit is committed. All that remains is the question of what direction your naturalizing will take. Scientist? All-around field-man? Specialist? Writer?

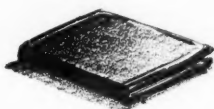
Myself, of course, I am a writing naturalist. That is the way my bent goes. Words come readily to me (too readily and too many, often enough), whereas, after all these years, I still have to look up Latin species-names in a textbook every time I need to recall one. My naturalizing is simply a devoted prowling around the common woods and fields and creeks, having a look into a woodchuck-burrow, seeing what the deer are up to, and writing down the things I see and the things I feel. I have been at it for a good many years now, and I expect still to be at it on the day before they print my obituary. For a naturalist is not something that a man ever stops being. A naturalist is a conviction in the bones, and in the heart a dream inalienable.

Why am I a naturalist? There come back to me across the years the words of an old naturalist long ago, talking about his love for watching birds and animals: "They are



our childhood come back to us, all instinct and joy and adventure." That is just about it, I think. I suppose I am a naturalist, and always will be one, be-

cause there were some truths I knew when I was ten years old that still seem to me everlastingly the truest things in the world.



Pollution Crusader

By WILLIAM GILMAN

IS RIVER pollution a "necessary evil?" Do not try that excuse on E. W. Miller, conservation-minded new president of the Fellows Gear Shaper Co., Springfield, Vt. He has proved the contrary; proves it every weekday by sending his Exhibit-A through Springfield streets.

This is a specially designed tanker truck that Mr. Miller has built to handle wastes from his plant, which builds machines found all over the world, creating gears for everything from watches to locomotives. Miller has hauled away weekly 10,000 gallons of used oils, grinding compounds, lathe chips, and such waste. Formerly, this industrial waste was dumped into the Black River, which passes the Fellows plant. Now it is hauled to a hill dump two miles from the river. Miller adds that reconverting the truck only cost \$600 in labor and materials.

"T&d" Miller practised reforestation as a hobby until increasing river pollution started his crusade three years ago. To gain supporters he pointed out that dumpage not only killed fish and endangered public health but spoiled water for many industrial purposes. He went on to stress the contradiction between the actual condition of Vermont streams and the "Unspoiled Vermont" slogan with which the state's press agents entice tourists.

The result was a Springfield mass meeting at which Miller was elected chairman of an action committee. His tanker truck, challenging the rest of the community to join the crusade, is a graphic example of his practise of what he preaches.

As a nationally known inventor and machine-tool builder, Miller uses the kind of technical arguments that other factory executives can understand. He describes "flock," dumped into streams by woolen mills, as a prime offender. These minute particles of wool



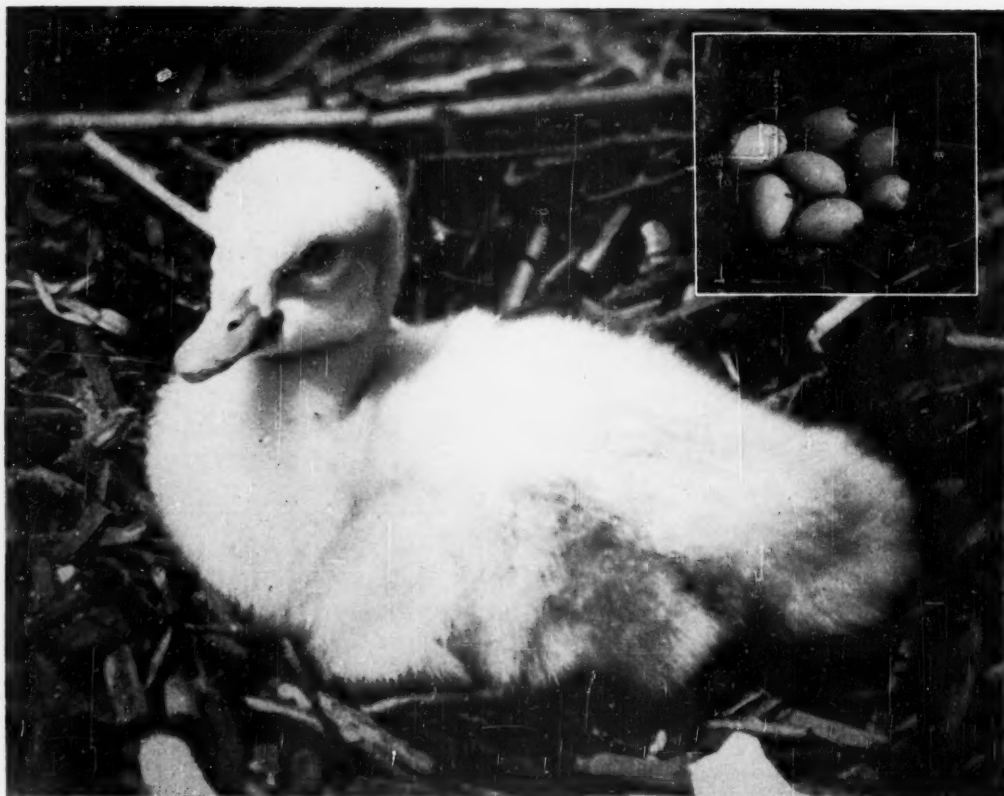
PHOTOGRAPH BY ELEANOR GILMAN

E. W. Miller, crusader against dumping industrial wastes into streams, instructs his driver, George Stannard, on the disposition of wastes from the Fellows Gear Shaper Company of Springfield, Vermont. Miller's truck carries a message to all.

are so fine that they pass right through screens into fire pumps and put them quickly out of commission—a reason why fish, their gills clogged with such materials, perish.

Miller believes that sewage, although bad enough, is not as harmful as industrial grease. Sewage can be rendered innocuous by effects of sun and oxidation. Grease remains unchanged, ruins a stream's beauty and hold other wastes in suspension, preventing the sun from purifying them.

"Streams are polluted in three ways," says this pacesetter. "By sewage and garbage, by rubbish of all kinds, and by industrial waste—grease, acids, dyes, flock and the like. Of the three, I'm convinced that industrial waste is the worst."



Closeup of a recently hatched young trumpeter swan. Inset is the nest of a trumpeter containing six swan's eggs and one egg of a Canada goose.

Our Swans Trumpet Good News

By GRACE V. SHARRITT

U. S. Fish and Wildlife Photographs

JUST before breakfast one bright May day, I went to the picture window in our living room to check on our wildlife neighbors. This window frames a particularly eloquent western scene of mountain peaks, sagebrush plains, a winding creek, marsh and grain fields.

In the field, near the ranch-yard fence, our horses grazed with a few elk. Against the faint green of the butte, ducks helped to make a sprightly canvas. Hunting for food in the swamp, a pair of sandhill cranes walked slowly, their red-capped heads bent to the earth. And from a fence-post a western meadowlark lifted its throat to the spring sky in a ripping melody.

All this I noted with interest. But I was actually searching for something else; something very special. I focused the binoculars on the winding creek, then

took in a wide semicircle over the marsh. Four, five, six blobs of white were silhouetted against the blue water. Then a streak of white bolted from the tules in pursuit of a Canada goose. That made seven swans. There should be another pair somewhere.

Perhaps they are nesting, I thought, as I hurried with breakfast. This would be a good day to ride to the top of the butte, which I call Trumpeter's Look-out.

These wild swans, which I think of as mine, do not, of course, belong to me. Actually they belong to no one but the Wyoming wilderness. Technically they are precious wards of Uncle Sam.

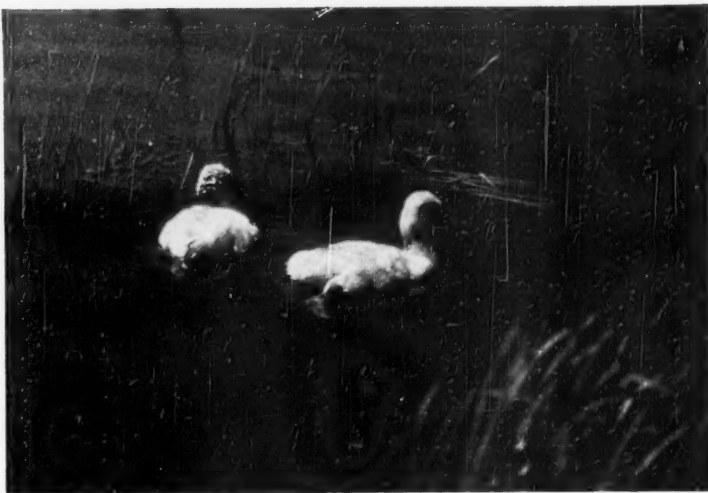
These wilderness swans are that rare kind called "Trumpeters," a species so rare that, only thirty or forty years ago, it was considered almost extinct. Even

Young trumpeter swans about five days old sailing confidently about on the waters edge of the refuge.

today, after painstaking efforts by the government to restore this magnificent bird, there are only a few more than four hundred of these swans, North America's largest waterfowl, in the United States. Nine of these are at home at the same address as mine, an enchanting valley near the Teton range of the Rocky Mountains, known as Jackson Hole, Wyoming.

Nine trumpeter swans may seem like a pitifully small number to write about, when compared to the thousands that once called haunting notes across the lakes and prairies of an abundant America. But each one of my regal, white-coated, black-billed, black-footed birds serves as a poignant warning of what has happened to less fortunate species, and what is now happening to the whooping crane and the ivory-billed woodpecker. Trumpeters in this small flock, which summers and winters on the warm springs of the creek on our government ranch of 25,000 acres—officially the National Elk Refuge—are direct descendants of the parent flock under Federal supervision at Red Rock Lakes, Montana.

Each bird is descended from those flocks that were decimated, in the latter half of the 1800's, by hunters, who slaughtered the birds for their downy breast feathers, or for food. This is past tragic natural



history now. Trumpeter swans are now fully protected by Federal laws. Since 1935, when the government established a waterfowl refuge at Red Rock Lakes, in southwestern Montana, primarily for the protection of the trumpeter, it is slowly making a comeback.

Fearful and watchful, all of us who are directly interested in their welfare count each year's birth increase with crossed fingers. So we coddle our diminutive flock. During the winter we feed the birds barley and wheat. This means a two-mile drive to the butte in the pick-up, or, if snow conditions require, with a team and sleigh. Then we must walk over an old game trail to our grain-box base at the springs.

The icy, rocky trail is treacherous. We stumble along clumsily in our heavy footgear, frightening the magpies that splash black and white warnings along the route. The magpies excite the swans, which fly around the bend of the butte uttering low guttural notes as they go.

We watch them fly out of sight. Then we get to work. Our mittened hands ache with cold as we toss the grain into the water. Flocks of ducks—mallards, pintails and green winged teals—fly unafraid overhead, waiting greedily for their share of the meal. The wheat sinks quickly to the bottom. That is for the swans. The barley



Trumpeters on their winter feeding grounds, with ducks, chiefly Barrow's goldeneyes, as company.

floats on top. That is provender for the hardy ducks.

The world is silent as only a Wyoming winter day can be silent. The stillness is almost hypnotic. We breathe deep drafts of pungent, sage-and-snow-scented quiet. Then a pair of swans flies into view, rhythmically beating huge, snowy wings. They perfect the idyllic moment with primitive wild trumpeting.

Did those early explorers, Lewis and Clark, Bridger and Sublette, we wonder, experience the excitement, when they witnessed flock upon flock of our continent's greatest waterfowl, that we feel when our nine appear in the sky?

When the snows leave and the creek opens we stop the winter-feeding. On spring-like days we can see the swans separated into pairs, sunning upon the banks. They sleep long hours, their heads folded beneath their wings. They swim slowly and elegantly upstream. Occasionally one utters a wild trumpet and chases a Canada goose, whose near presence they resent. On one occasion, in November, 1943, on the Red Rock Refuge, trumpeters killed a whistling swan that had entered a small open-water area where food had been placed.

Then, one April day, while we were driving along the Yellowstone Highway, which edges our ranch and creek for a short distance, one of our human-shy swans was putting on a show in the pond next to the highway. As though he were a tame, city-park waterfowl, the bird was actually diving for food that a tourist in a station wagon was throwing to him!

The swan's mate, who had not flown over the Refuge fence into this pond near the road, was almost hysterical, either in rage, fear or jealousy, we did not know. She called wild notes. She raised her enormous snowy wings and beat the air frantically. The male paid no attention.

Quite a crowd of travelers had collected to watch the swans. But few knew that they were witnessing one of the strangest demonstrations by one of the rarest waterfowl in North America.

Spring had certainly changed the disposition of this pair of trumpeters. From that day these two definitely became associated with the creek near the highway. This apparent desire for the limelight of tourist favor made us fear for the birds' safety.

That was the startling event as April merged into lusty May. In our country, spring comes vividly and abruptly, and summer is but a passing dream. Columbines graced the mountain slopes, and scarlet gilia and paintbrush dressed up the naked canyons. The yellow-headed blackbirds had come and gone in migratory waves. The sage grouse were indulging in their annual courtship dance at the strutting grounds, and fishing was good in the Snake River. Snow now topped only the highest peaks of the Tetons. Yet our swans seemed not to be aware that it was time to get down to family responsibilities.

That is, they did not until the May day with which I started this story. My ride to the top of the butte

that morning was without incident. I found a seat on a flat rock in the sun. Below me wound the creek, a blue sash, knotted here and there with green marsh-grass. The frontier town of Jackson lay, quaint and peaceful, tucked against the mountain. I could hear the sandhill cranes rippling their calls. I could hear and see the swans.

I spotted one blob of white upon a mound! I focused my binoculars on a little pond. Partially hidden by brown tules, a swan was sitting upon a nest, which looked like an old muskrat house. Her mate swam nearby.

A pair of red-winged blackbirds disturbed her, flying about her head. As she reached out to strike at them, I noticed that her long neck had brownish streaks, blending with last winter's dead cattails. No doubt the red-wings planned a nest nearby, and did not wish trumpeter swan neighbors.

I swung my binoculars in a wide semicircle. There, in a distant inlet, almost too far for me to distinguish, was another blob of white upon a bank. And another mate was in the water nearby. Two pairs were nesting! For the first time in our history of trumpeter watching, and perhaps not since the 1800's, when early settlers had told of this marsh with its abundant swans, had this species nested in Flat Creek. I rushed home to tell the news. Paul Revere's ride must have been dull in comparison.

The intervening weeks, between discovery of the nests on May 24 and the hatching of the cygnets the last week of June and early July, was one of constant vigilance. We sweated over that incubation period as if it were we who sat on the nests in the alternate sun, rain, hail and winds of raw Wyoming weather. We spent long hours guarding the swamp. We patrolled the highway. We spied from Trumpeter's Lookout.

Then, from the butte, one morning in late June, we noted one mother arise carefully from her nest, which was almost completely hidden among the summer's lush growth of sedges. She arched her beautiful white wings. As she did so, we saw two gray babies. She stretched and lifted her wings as though to give them air, yet still shielded them.

The next day the brood had grown to five youngsters. My husband wanted to rush home and pass out the cigars!

Through the weeks of incubation we had not been able to determine the number of eggs in the nest. When Mrs. Trumpeter left to get food, she skillfully covered the eggs with grasses. And, of course, we never went near the nests! The swamp was completely the birds'. No one was allowed in this swan-territory, and Flat Creek was closed to fishing in this complete area.

The next morning, when we took up our eight o'clock vigil, the proud family was out swimming on the creek! But instead of five gray cygnets there were now only four. During the night, when Mother Trumpeter had taken her brood through the high marsh grasses, some- (Continued on page 346)

"On his hind legs, as erect and motionless as a West Point Cadet . . ."



Photograph by
W. J. Schoonmaker

AFTER a day spent in a steaming office—where the wallpaper should be asbestos—and a forty-five-minute drive home through blatant traffic, a man is ready either for the laundry or a psychiatrist. If it were not for the woodchuck colony on the hillside of my farm, I might have ended up as a steady customer of the latter.

My car would deliver me, a soaked and weary mess, at the door about 5:30 every weekday evening. Supper was planned for seven, and I had to find an appetite for it, and a cooling-off process for myself. A change of clothes and a climb over the back fence, and I was well on my way to finding both.

Our farm straddles one of the high ridges that run north and south through the central New York dairy-land. Scattered stands of maple and birch hang over the top of the ridge, and barley and corn fields flank the western side all of the way down to the house. On the eastern slope, the far side that first sees the morning sun, and also cools in the evening shadows, the woodchucks have colonized a twenty-acre pasture.

After I climb that back fence, I go through my wife's manicured truck patch. With each step on the soft, rich soil the fatigue of the day seems to drain away and be soaked up by the warm earth. Blaring automobile horns and broken air-conditioning systems are forgotten. One begins walking on tiptoes when the rows of sweet corn are reached.

On the other side of the head-high corn a pile of uprooted stumps and battered fence rails, ten feet high, is the private domain of the biggest woodchuck on the farm. His fur is hoary with age, but his senses are still razor sharp. He likes to climb to the topmost jutting fence rail and survey the scenery.

Will I be able to surprise him this time; perhaps catch him 'chuck-napping atop his perch? I inch forward to the last rows of corn and peer between the

stalks. My approach has been noiseless, and maybe this time . . . but—z-i-i-i-p—there he goes!

Scuttling down from the rails, he ripples with fat. At the bottom of the heap, where his den entrance is located, he stops for an instant before disappearing—turns to glare at the cause of this disturbance. I feel as if I should apologize to him.

As I leave the cover and skirt a field of bearded barley, I note that the grade becomes steeper. Then I climb through another fence, and am at the top of the ridge. On the other side of an elderberry thicket is the pasture with the woodchuck colony.

At this point I drop to my knees and crawl to the brow of the hill. From behind a

thick clump of grass I raise my head. There, fifty feet down-hill, is a pair of 'chucks in the middle of a clover patch. Farther down-hill a fat rascal is stretched out on a rock, dozing in the last rays of the sun.

Crawling out a little farther, like a big measuring worm, I find a more comfortable spot. Over on the left, where several sumacs have ventured out from the wood's edge and have gotten themselves lost in the pasture, a woodchuck is standing at attention on his doorstep. On his hind legs, as erect and motionless as a West Point Cadet, he is making sure there are no enemies in sight. For almost five minutes he holds his pose, then, not having seen me, he drops to all fours and waddles to his feeding patch.

Resting my eyes for a minute, I admire the panoramic view from the ridge. On the far side of the valley the farms, with their neat, quiltwork fields, look like those miniature scenes often set up under Christmas trees. To the north, clear as crystal in the evening air, lies pale-blue Oneida Lake. That water is twenty miles away, but it seems close enough for one to hear the rippling waves as the breeze ruffles them.

Woodchuck Therapy

By ROBERT PEEL

But look! Only ten feet away a woodchuck, up on his haunches, is staring right at me. He must have been feeding in the deep grass as he moved up-hill. Now that he has seen me, he is a nervous mixture of fright and curiosity.

His eyes are beady with excitement, his stubby ears are twitching, and that moist little nose is doing its darndest to try to figure me out, I do not move a muscle; maybe he will come closer.

Oh, oh! He finally added everything up and decided that I was not welcome. That shrill whistle he gave just before he turned tail and rocketed down-hill will spread the alarm to every 'chuck within a quarter-mile. All over the field they are scooting for their holes—the pair in the clover patch, the fat fellow on the rock, the cadet over by the sumacs. And there are two more I had not seen.

Well, the game is over for tonight, and I might as well stand up and head for home myself. But on the way back, near the elderberries, I have a stop to make. There is a woodchuck den here, and I have not seen its roly-poly occupant for almost a week. Just to see if he is still at home, I get down and, putting my

face placed close to the hole, make a chirping noise.

The chirp is nothing like woodchuck talk—it sounds more like a strangling canary—but it does attract the ever-curious fellow. One can hear him scuffling toward the entrance; then he rounds the last turn and there he is. Blinking his eyes for a moment, he surveys my face, only a foot from his own. Finally he stamps his forefeet and, snorting with disgust, backs down the tunnel. Both curiosities have been satisfied.

Then I go down the hill to the house with a healthy appetite under my belt. A soothing closeness to Nature has stilled the trip-hammers in my head, and tomorrow is something to be anticipated, not feared.

Suppose that I had carried a rifle up to the ridge? In two or three nights of slaughter I could have eliminated the source of a summer's pleasure. But, my way, I learn something new every night; like the time I watched a 'chuck climbing a scrubby, wild cherry tree.

Here is the back fence by the truck patch, and I scamper over like a chipmunk. The therapeutic values of that woodchuck colony of mine are truly amazing.



Flaming Symbol

By GERHARD FRIEDRICH

Not an oak as in summer,
Not a starry-leaved maple:
This is not a tree any more!

This is the radiant farewell of the autumn,
A scarlet message,
A torch held high
By a patient, invisible hand
Into the dusk of the dying October.

I have to strain my inveterate soul
To read the meaning
Of a glowing so deep and intense,
So solemnly wild.
Can the spirit be captured?
Or will it be hidden forever?

I will let you teach me your power,
Flaming symbol!
I will learn from you like a diligent child
Until I can comprehend your lifeblood's secret.
And then I shall go and help to rekindle
Among the world's ashes
Some sudden flashes of hope unsundered,
Some brilliant fires,
Some simple halos of friendship and love.

Fern Cave

By RUTH E. HOPSON

Photographs by Author

Entrance to Fern Cave, surrounded by sparse, desert-type vegetation. Mount Shasta rises above the plateau in the distance.



LUSH ferns of the rain-forest growing in a cave in the midst of a lava desert in winter—such is the anomaly of Fern Cave. This is only one of approximately two hundred caves that form a part of the Lava Beds National Monument in northern California. In a number of ways, however, this cave stands out from the rest.

The approach to Fern Cave is over a relatively level volcanic plateau, strewn with rough lava boulders. The scanty plant cover is the typical association of sagebrush and rabbit bush. Flocks of horned larks frequent this region. Marsh hawks, which fly low over the desert, searching for rodents by day, surrender their hunting ground late in the afternoon to the short-eared owls. A dead coyote near the entrance to the cave was evidence of the presence of this crafty mammal in the sagebrush desert. Mule deer are often seen browsing amid the shrubs.

Near the cave, the vegetation becomes sparse, and, in winter, consists mainly of dry grasses and Jim Hill mustard. A slight rise warns of the entrance to the cave, which otherwise is so inconspicuous that one could almost drive into it without seeing it. From the opening, a twelve-foot ladder affords easy descent. At one place along the rim of the cave a gentle breeze of warm, moist air issues. An abundant bank of lush, verdant ferns greets the first glance into the cave. At the time of my two visits there—January 17 and 31, 1948—the largest fronds were each about two and a half feet in length. Each of the many points of every frond was tipped with a jewel of dew. The moss on the roof was also dripping with moisture, and that on the floor was saturated.

The ferns grow on a pyramid of large rocks formed

from the broken pieces of a collapsed section of the roof of the cave. The largest ferns are directly below the opening. Farther from the light, the ferns become gradually smaller, and beyond the main bank of ferns, where only filtered light can reach, are found several patches of fern prothallia like pieces of a rich-green pile fabric.

The name of the fern that grows in such splendor in Fern Cave is spreading wood-fern, *Dryopteris dilatata*. This species has circumpolar distribution. Its range is given as Alaska to Newfoundland, south to California, Montana, New England and in the mountains of North Carolina and Tennessee; Greenland; Eurasia. In books of taxonomic botany for the Pacific Coast, its habitat is described as "deep woods and stream banks," or "near the coast on fallen logs in the shade of dense woods." I have seen spreading wood-fern many times in such locations, or on the shaded cliffs near the sea. On the road to Bayocean, west of Tillamook, Oregon, I have seen this fern growing in the cave-like recess of a damp, deeply shaded cliff.

In our woods, the fronds of spreading wood-fern die down in winter. In Fern Cave, they exhibited the most luxuriant growth in the middle of the winter, when outside temperatures were averaging well below freezing. On my second visit to Fern Cave, the temperature inside and outside the cave was fifty degrees Fahrenheit. On my first visit, when I was not equipped with a thermometer, the temperature outside was below freezing but the cave seemed warm and comfortable. For proof that it was so, two small fence lizards were basking in the moist warmth of the cave. Although these lizards normally hibernate in winter, within the



Spreading wood-fern in Fern Cave, photographed in January. The tangled, succulent fronds cover a pyramid of rocks, twelve feet below the surface of the ground. Many of the fronds are two and one-half feet long. In the foreground the floor of the cave is moss-covered.

cave these two were active. No more were found. The second visit to the cave yielded a male Pacific tree frog. While I held him, he croaked away, extending his little black throat.

A thick layer of owl pellets, each an inch and a half long or longer, was near the entrance. Some of the pellets were molding. Bull snakes are reported to inhabit the cave in the summer. Purple martins nest there.

In 1938, when Elmer I. Applegate published *Plants of the Lava Beds National Monument, California*, there were no spreading wood-ferns in Fern Cave. Therefore he did not include this species among the plants of the Lava Beds. A fern, presumed to be this species, had grown there previously, but was depleted by people from surrounding areas who wanted them for their rock gardens. The destruction was needless; spreading wood-fern will not succeed under the direct rays

of the sun. Hopeful of restoring the ferns, the National Park Service closed Fern Cave to the public. In ten years the ferns have returned in abundance.

One wonders how the spores of spreading wood-fern could have first reached the cave. The nearest location in which this species grows is probably on the western side of the Cascade divide. I have not had an opportunity to explore this region for the fern, but the nearest locality in which it grows in its normal forest habitat is probably fifty to one hundred miles away. Of course the spores are exceedingly light and possibly could be airborne for that distance.

A single clump of gold-back fern, *Pityrogramma triangularis*, grows on the rim of the opening to the cave. This species is found in suitable places throughout the Lava Beds National Monument. It is typically a rock-fern that is able to desiccate during dry weather and to revive with the return of moisture.

Characteristic evidence that the Indians utilized this warm, moist cave is found commonly within. Pictographs line the walls of Fern Cave. Lichens are beginning to cover many of them. The pictographs were made by applying some black substance. Unfortunately, chalk has been placed on top of the black by photographers who wished to take pictures of the pictographs.

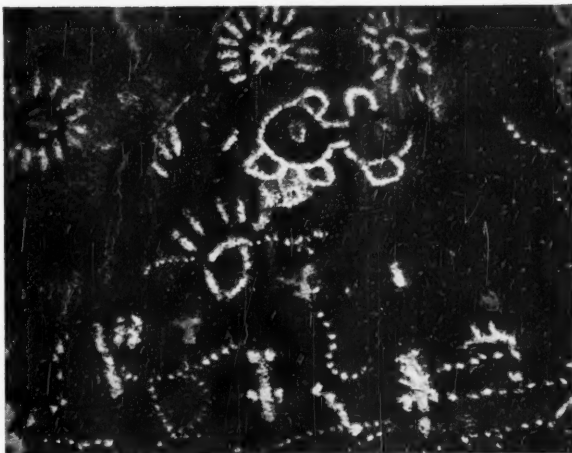


A mortar in a large slab of lava on the floor of Fern Cave, relic of Indian occupation.

Pictographs left by Indian occupants of Fern Cave. These have not been interpreted or precisely dated. They have been outlined in chalk by photographers.

An archeological reconnaissance was carried out at Fern Cave, and at other caves in the vicinity, from November 18 to December 4, 1935, by members of the National Park Service. In Fern Cave, a main trench and two lateral trenches were dug. Stratified materials, including a fireplace, were found. Artifacts recovered included stone awls, arrowheads, mortars and pestles, and bits of mats or baskets. Care was taken not to exhaust the possibilities of the cave and to leave most of the deposit undisturbed for future study. The evidence obtained was inadequate for placing the time of the cave's occupation, however. The arrowheads were small and must have been used largely to obtain game.

And so Fern Cave retains its mystery. From whence came the ferns? Why is this cave the only one out of almost two hundred at the Lava Beds National Monu-



ment to have warm, moist air throughout the winter? How does this unusual environment influence its animal inhabitants? And who were the Indians who once lived in this homesite, so near to game and water-birds of Tule Lake, which must have supplied food?

★ The Hermit's Departure

By OSCAR OSTLUND

These feathered forms, so tiny in
the forest's massive spread,
Mid foliage and rufous tinge of evening light,
almost invisible; while yet they sing on every watershed.
But when they have flown, and you, with ears addicted
to the hermit's flute,
Are listening, hoping you may hear, yet one more airy
lyric in the stillness . . .
Then all the forest seems to speak
of some great organ, mute;
The very mountain whispers to you its emptiness.



High-Climbing Porky



THE picture at the left may not be a sharp one of a porcupine, but it is remarkable for one reason. Porky was photographed fourteen thousand feet above sea level on the ice and snow of Mount Rainier. A. F. Wilson and Arthur J. Landry of Bremerton, Washington, and George W. Purdy of Port Orchard, who took the picture, were on a climb when they met the porcupine. What it could have been doing at this elevation was anybody's guess, and its chances of survival in the cold, without food, seemed to be slim. But there Porky was, as testified to in an affidavit signed by all three of his fellow mountain climbers.

Mice or Men

By E. LAURENCE PALMER

This is another in the series of special educational features by Dr. Palmer. With our November issue, however, we will restore the eight-page special educational inserts that have appeared for many years.

THE phrase "mice or men" is usually used to compare two widely different characters. Here, it is used in another sense, for in this article we consider the two as rival competitors for a common reward. There is as much competition between mice and men as on the football field between Harvard and Yale, Cornell and Syracuse, Stanford and U.C.L.A. Either men are to inhabit this "plundered earth" of ours, and use it to supply their own needs, or mice may take over and starve man out. If men are to increase and multiply, the time must come when the men must quit or the mice must stop. Will the meek inherit the earth? Will man be justified in claiming that he is the most intelligent of animals?

Certainly, if man is as intelligent as he claims, he must in the future demonstrate that fact more than he has at times in the past. Generalizations must stop. All Americans are not good or all Russians bad; noisy and pestiferous members of any group or organization are not typical of all of the members of these groups. By the same token, all mice are not just mice. We cannot indict them all for the acts of a few and still be fair or accurate. Neither can we ignore them as inconsequential because we do not see some of them at their work. If we must compete with them for the grass of the fields, the fruits of the orchards, and the crops in our gardens, we must know them for what they do and how they live. This article is written in the hope that a few more of us may come to know more than we now do about some kinds of mice.

This article must not be considered as being exhaustive of the subject. We have not considered the pack rats of the mountains, the lemmings of the great north country, the hamsters of the laboratories, the muskrats of the marshes. These are all members of the Family Cricetidae and are properly considered as mice. The common house mouse is not a native of America and does not belong to this family, having differing characters, as given in the accompanying tables. Also, the delightful jumping mice of the woodlands or meadows

are not members of the Family Cricetidae, the differences being obvious, whether the individual is in a museum case, or, better yet, leaping gaily about out of doors. According to structural standards recognized by zoologists, a common Norway rat is more closely related to a house mouse than it is to a rice rat, or to a cotton rat, which it closely resembles. Anyone interested in actual relationships will find plenty to do in keeping the rats and mice in their proper category.

There are, however, more important features than relationships. We judge animals, I hope, more by what they do than by the reputations that may attach to their common names. If this is the case, we must be cautious in coming to final conclusions about our common mice. We may take our cotton rat as an example of how easy it is to misjudge an animal. True, it lives in cotton fields, gardens and hedgerows. It feeds generously on insects, and for this we should be grateful.

It also feeds on quail eggs and young, and this we do not approve. The cotton rat provides an important part of the diet of such furbearers as foxes and minks, and for this we should be thankful. But it also eats sweet potatoes, newly planted seedlings of fields and gardens, and these traits we naturally resent. Men could easily get shooting mad if they tried to reconcile all of these relationships in a common neighborhood.

We need not repeat here what is given in the accompanying tables, but we do want to call attention to the great variations to be found in the habits, economic importance and appearance of our common mice. You will see that, while some, like the meadow mice, are active the year round, day and night, others, like the jumping mice, may sleep safely during at least half of the year. We find that while house mice may live in houses they may become serious pests in the fields. We find that some mice favor woodlands, while others favor open fields, and still others are at home only in the wettest of places. And so we see, day or night, summer or winter, in one place or in another, some



WHITE-FOOTED
DEERMOUSE



HOUSE MOUSE



MEADOW MOUSE



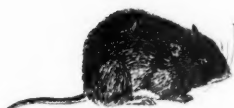
RICE RAT



HARVEST MOUSE



COTTON RAT



RED-BACKED MOUSE



WOODLAND JUMPING MOUSE

mouse species ready to compete with us for the fruits of the earth. We find some of them carrying diseases, and some being useful as laboratory animals to study our own diseases. We find them living in the tree tops or burrowing into the ground. We find some to be immaculate house-keepers, and others filthy about their home premises. We find some docile, others ready to fight when cornered, and still others scared out of their wits even when only closely pursued. They may have big eyes or small eyes, large ears or small ears, long tails or short tails, short legs or long legs, and with each structural difference an associated difference in behavior. So mice offer an interesting field of study for one and all.

Men must recognize in some of the mice our arch



MEADOW JUMPING MOUSE

enemies. We must recognize the merit of foxes, weasels, coyotes, snakes, minks and other mouse catchers. We must know of the habits of most of our hawks and owls, and let our knowledge condition our own behavior toward

these birds. If we try alone to match our wits against these small animals, we may lose the fight. Instead of feeding cattle for the market on our western ranges, we may raise grass for mice that have no market value. The price of beef may go up and cattlemen may demand extended grazing rights in territory that by rights should serve other purposes. Yes, we must know our mice, their friends and enemies, and we must let our knowledge be our guide. If we do not, men must give way to mice and it will not be a happy world for ourselves, and worse for our descendants.



Squatters' Rights

(Continued from page 308)

seized this ground, taking such possession as we have without a by-your-leave from the creatures to whom it belongs by birthright. Among all these tenants, each with a prior claim, we know and feel that we are usurpers; friendly intruders, we trust, yet entirely uninvited guests nevertheless.

What would happen, should we absent ourselves for a brief period of years, is vividly impressed on us by

a former human dwelling a short half-mile away, and much less secluded. Its gaping sides admit passage in and out to all manner of wild things. Briars and nettles poke through the floor. A tangle of wild vines runs riot over the falling roof. The dooryard is a regular runway for deer. Nature has reclaimed her own, and I have come to feel that nothing could be more just and fitting than to restore full possession of their property to our wild tenants. This would be the most kindly and appropriate destiny we could wish for a spot that they have made so enchanting. So, for now, we are enjoying squatters' rights only.

COMMON NAME	HOUSE MOUSE	MEADOW MOUSE, VOLE	WHITE-FOOTED DEERMOUSE	HARVEST MOUSE
SCIENTIFIC NAME	<i>Mus musculus</i>	<i>Microtus pennsylvanicus</i>	<i>Peromyscus leucopus</i>	<i>Reithrodontomys humulis</i>
DESCRIPTION	Total length, to 7 inches of which to 3½ inches may be tail. Sexes colored alike a uniform brown-gray with lighter underparts. Tail poorly supplied with hairs. Hair generally short and close, making animal appear sleek. Nose pointed. Ears large and erect. Body rather conspicuously slender.	Total length, to 7 inches, with 1 4/5 inch tail. Sexes colored alike, a uniform chestnut brown with black sprinklings, gray beneath, with cinnamon sprinklings. In winter, grayer; and in summer, darker. Tail longer than hind foot and ears longer than surrounding fur. Molars without roots and not red above.	Total length to 7½ inches including 3½ inch tail. Front incisors not grooved. Ears large, white inside and blackish outside in young but dusky in adults. Dark brown above and feet and underparts white. Tail white beneath and dark brown above with pencil of hairs at tip. Young light slate gray.	Total length to 5 inches, with tail to nearly half total length. Ear, nearly ½ inch long and hind foot to .7 inch. Crowns of molars with 2 rows of tubercles and front upper incisors with longitudinal groove. Inconspicuously colored and resembling a house mouse. Dark brown above and grayish to pinkish beneath.
RELATIONSHIP	Unlike other mice here treated, the house mouse belongs to the family Muridae and is more closely related to a rat than to our common wild mice. In the Muridae, the molar teeth have 3 rows of tubercles while in the Cricetidae the tubercles are in 2 rows or the crowns are flat. House mouse is of Old World origin.	Over 40 <i>Microtus</i> found in North America, in one form or another practically covering continent. Species names, such as <i>pennsylvanicus</i> , <i>montanus</i> , <i>californicus</i> , <i>mexicanus</i> , <i>abbreviatus</i> , are suggestive of range or structure. <i>M. pennsylvanicus</i> ranges from Nova Scotia to British Columbia south to North Carolina.	At least 17 American species and many more subspecies in the genus. Common <i>leucopus</i> has tail less sharply contrasted in color above and below than in <i>maniculatus</i> . <i>P. leucopus</i> and subspecies range through most of eastern half of United States and west to Rockies. <i>P. maniculatus</i> ranges to west and north, but the two ranges overlap.	At least five American species of the genus with <i>R. albescentis</i> and <i>R. humilis</i> in the middle west and southeast, and <i>R. megalotis</i> , <i>R. montanus</i> , <i>R. catalinae</i> and <i>R. viverrinus</i> in the West. <i>R. montanus</i> is found west of the Mississippi excepting in a few spots in Wisconsin. Genus most abundant in Central America, and not found northeast of Maryland.
REPRODUCTION	Breeds promiscuously, with young being born at any time of the year. Young to 11 in number are born 21 days after the breeding, are weaned at 3 weeks and the females may breed when 2 months old. A pair theoretically could produce to 1,000 descendants in a single year. Life span probably about 4 years.	Females may bear 13 litters a year. Promiscuous. 21 days after breeding, to 8 young may be born followed by immediate breeding of mother. Young weaned at 10 to 12 days. Female breeds at 1 month of age, male at 45 days. One female may bear 100 young a year. Life span to 1½ years.	Young born three weeks after the breeding. At birth are 1½ inches long. Eyes open 18th day. Weaned at 14 to 21 days. Half grown at 3 weeks. Female matures at 29 days and conceives at 39 days. Male matures at 39 days. May breed until 33 months old. Life span is probably to 5½ years but few live that long.	In the Southeast, breeding commences in March and may continue to December. 2 to 7, but usually 4 young are born and sheltered in grass nests sometimes placed in shrubbery well above ground. Young, but not the mother may leave nest at end of 10 days. Probably several litters a year.
HABITS	Food a variety of plant and animal matter either harvested fresh in field or garden or stolen from stored supplies. Storage instinct developed to some extent but no cleanliness of nest is displayed. There is no hibernation. Individuals may have a sweet squeaking sound or song.	Eats little other than plants but may eat its own weight in plants a day and destroys much more. One requires about 23 pounds of green plant material a year. Active day and night through the year, girdling trees, destroying forage, eating vegetables but also being the food for valuable fur-bearers.	Food about equally plant and animal matter, some plant material being stored. Elaborate house is built in protected spot, or abandoned bird's nest is roofed and used. May enter house in winter for shelter and create havoc in an attic among stored articles. Usually leaves for outside in summer, but may remain and breed in North.	Feed on seeds and fresh vegetation, storing seeds to some extent but are not usually abundant in cultivated areas. Active day or night throughout the year with no hibernation, favoring wet places, where they establish definite runways that lead to the nest, which usually has a single entrance.
ECONOMIC SIGNIFICANCE	Populations of 82,000 per acre have been recorded. This is a California record. Next to rat this is probably the most destructive of mammal pests and the most dangerous in some ways. It fouls books, destroys clothing, ruins food, carries diseases, including spotted fever. Used sometimes as laboratory animal.	Destroys at least 3 million tons of hay a year and is much more serious enemy of range cattle and sheep than are coyotes. 1 acre may support to 300 mice but a temporary population of 12,000 per acre has been recorded. Is clean about its home and has some slight storage instinct.	Causes some damage to articles stored in houses but not so destructive to woodwork as are house mice or to vegetation as are meadow mice. Of considerable value as insect destroyers and form part of diet of valuable fur-bearers. Animals are generally gentle and interesting to watch unless causing destruction.	Not a menace to crops because of the type of land they favor. May form a major food for valuable fur-bearers and as such must be considered as beneficial, particularly when it is recognized that they relieve food pressure of carnivores that might be enemies of birds, game and poultry.

RICE RAT <i>Oryzomys palustris</i>	COTTON RAT <i>Sigmodon hispidus</i>	RED-BACKED MOUSE <i>Clethrionomys gapperi</i>	MEADOW JUMPING MOUSE <i>Zapus budsonius</i>	WOODLAND JUMPING MOUSE <i>Napaeozapus insignis</i>
Length overall to over 11 inches. Much like Norway rat but has two rows of tubercles on the molar teeth. Front teeth not grooved. More sleek than the cotton rat. Gray or brown above, paler beneath, the fur being rather woolly. Feet, white above. Tail dark brown to black above and paler beneath, slender, scaly, poorly haired.	Total length, 8 to 11 inches including 4-inch tail. Upper parts grizzled brown with the tips of the hairs black. Sides paler, and beneath pale gray to pale brown. Tail scaly, sparsely haired and darker above than below. Ears, black. Feet, gray to dark brown. Weight, 80-120 grams. Front teeth not grooved.	Total length to about 6 inches but usually smaller. Tail about 1½ inches long, hind foot, 4/5 inch. Weight, 20-28 grams. Rather plump, small-eyed mouse with rather long fur usually marked down the back with a broad reddish band. Molar crowns without tubercles, rooted, red above and brown sided. Incisors not grooved.	Total length, to over 8 inches of which over 5 inches may be a slender poorly haired tail ending in a tuft of hairs and that is not white. Hind legs are exceptionally long and upper incisors bear prominent longitudinal grooves. Yellowish fawn color and blackish in summer; duller, yellower in winter.	Total length to nearly 10 inches of which the tail may constitute 6 inches or more. Weight, to about 20 grams. With 3 upper cheek teeth instead of 4 as in meadow jumping mouse and with the tip of the tail definitely white. Incisors in both genera are deeply grooved and the hind feet are long.
Over 150 species and subspecies of the genus but relatively few are found in North America. <i>O. palustris</i> ranges from New Jersey to Kansas and south into Texas and through Florida in one form or another with other species extending range widely to central America south of our area.	Ranges from southern Virginia to Florida and west to Tennessee and Louisiana with eleven subspecies recognized, three of which are confined to southern Florida, and two related species in the United States. Southern groups extend range through Mexico to Peru.	Nearly 20 species of the genus in North America with some extending north to the limits of the tree zone, while others go south, at least in the highlands, to parts of the Southern States. It is, however, essentially a genus of the North and of the wooded areas there.	Related woodland jumping mouse has white tip to tail and 3 instead of 4 upper cheek teeth. Over a dozen species in the genus in North America ranging mostly in the northern United States and Canada on to Alaska.	At least 3 subspecies of the species are to be found in North America confined mostly to the East north of West Virginia, and to southeastern Canada. Maine, Wisconsin and North Carolina in general define the range of the genus with woodlands being usually the favored habitat.
In the area near mouth of Mississippi breeding begins in February and extends to November with 1 to 7 young born 25 days after mating. Though blind at birth, they see at 6 days and are weaned and independent by 11 days. Of course, there may be more than one litter a year.	Breeds probably through the year although not in all places. 8 to 12 young develop rapidly and leave nest to begin independence when 5 to 6 days old. There are, of course, a number of litters a year. Populations vary greatly from year to year, but usually high.	Breeding begins in early winter or late spring and continues to late in the fall. From 2 to 8 young are born 17 to 19 days after the mating and develop so fast that members of the earlier litters may themselves produce young by the end of the season. Nest is grass-lined in shelter near surface of ground.	After a mating in May from 3 to 6 young may be born in June with a second litter in late summer. Protected by a nest of vegetable material possibly under some board or in open field. May hibernate from September to April being one of the longer sleeping species, may even become dormant on cold summer nights.	In late June or early July, first litter of season composed of 3 to 6 young is born, young being poorly developed and therefore sheltered in a nest. A second litter may be born in early September. Hibernation may occupy approximately six months and the sleep is sound. May sleep in pairs.
Animals thrive in grass-lands, salt marshes or even in clearings in woodlands. They prefer wet or marshy areas and swim readily. They favor grains as food, particularly rice, and are eaten by cottonmouth moccasins, foxes, skunks, minks, weasels and birds of prey of many sorts.	Crop lands, waste lands, meadows and pastures or even forests support cotton rats. Food flesh or grass being highly destructive to quail eggs and young and eating fish, crabs and insects. Is the chief food of many snakes, birds of prey and valuable fur-bearers which keep them somewhat in check.	Food mostly plants including nuts, berries and general vegetation to be found in woodlands. Some food is stored though the animals are active through the winter and either at night or in broad daylight. Favored sites are old logs, trash piles and mossy spots in either evergreen or broad-leaved woods.	Active day or night in summer not sticking to established runways but leaping possibly 10 feet and balancing with the tail. Do not store vegetable food but do store fat which sees them through the long winter. Food essentially vegetable matter. Enemies include, snakes, hawks, owls, foxes, and weasels.	Food may be fruits and insects. Nest for young and for hibernation may be in cavity some feet underground but there is no storage of reserves except in the form of fat in the body. Enemies are the usual flesh-eaters that are active in summer but the winter sleep provides considerable protection.
Highly destructive to rice fields, particularly when fruit is in the formative stage and certainly cause more damage than the foxes, skunks, weasels and snakes that prey on them, and which usually are hated and killed by farmers whenever possible.	One of the most destructive of animals in the agricultural South, destroying sometimes half a sugar-cane crop, wrecking market value of sweet potatoes, and eating newly planted seeds as fast as they are put into the ground. In one prewar year in Florida, cotton rats caused \$150,000 damage.	May become a serious pest in new forest plantations where they may girdle and destroy great numbers of trees, young and old. Even trees with a diameter of a foot are not free from destruction by these animals. They are preyed on freely by the flesh-eaters of their surroundings and are reported to be good to eat.	While it may eat insects, its major food is plant material often including grass tops brought to earth by successive cuttings of the lower plant parts and a resulting pile of grass stem sections. Such beautiful interesting creatures that few humans would wish for their destruction at any time.	Of no great economic importance since they do not live where man or his important food crops are most active. They do undoubtedly provide some food for valuable fur-bearers and do destroy a considerable number of harmful insects and other small animals. Habits are always intensely interesting.

The Jackson Hole Elk

EVER since its establishment by Presidential Proclamation in 1943, Jackson Hole National Monument has been the center of controversy. Its history as a potential part of our National Park system, however, dates back thirty years, when the first piece of legislation was introduced in the Congress seeking to extend the boundaries of Yellowstone National Park to take in the present Grand Teton National Park and most of the area now included in the Monument. This failing, local Wyoming citizens sought to raise funds to purchase private lands in the present reservation area, these to be donated to the Government. Such funds were not forthcoming, and John D. Rockefeller, Jr., becoming interested in the region, set about acquiring private lands, with the cooperation of Presidents Coolidge and Hoover, for eventual Park purposes. He gradually bought up 15.2 percent of the present Monument acreage of 223,000 acres, of which 77.6 percent were already federally owned, 6.6 percent still in private hands, and .6 percent owned by Wyoming.

In 1930 the Special Wildlife Committee of the U. S. Senate visited Jackson Hole and found local citizens eager to have set aside an area even larger than the present Monument. Legislation seeking to accomplish this got nowhere, and, in 1943, Mr. Rockefeller asked that something be done so that he could donate his lands to the Government. So, acting under the "Antiquities Act," President Roosevelt carried into effect the objective of his predecessors in office.

Immediately a small group of Wyoming citizens became vocal in opposition. Their arguments were compounded of prejudice, politics and misrepresentation, with considerable dashes of stubbornness and downright childishness. Congressman Barrett of Wyoming introduced legislation to abolish the Monument, and such a measure was passed in 1944 and given a pocket veto by Mr. Roosevelt. A rider was tacked on the Interior Department appropriation bill forbidding the use of any funds for the administration or development of the area, and this has become an annual affair.

One after another, lame arguments were put forward to block any settlement of the issue. These were, one by one, knocked down by fact and common sense, until, now, the opponents of the Monument are down to just about their last red herring—the question of the management of the Jackson Hole elk herds. Actually the Jackson Hole issue has become a sort of test case for those who seek to sabotage for private exploitation our whole system of public lands administration. The elk question has unfortunately been accepted by some conservationists as the "crux" of the problem, instead of for what it really is—the latest disguise of the exploiters.

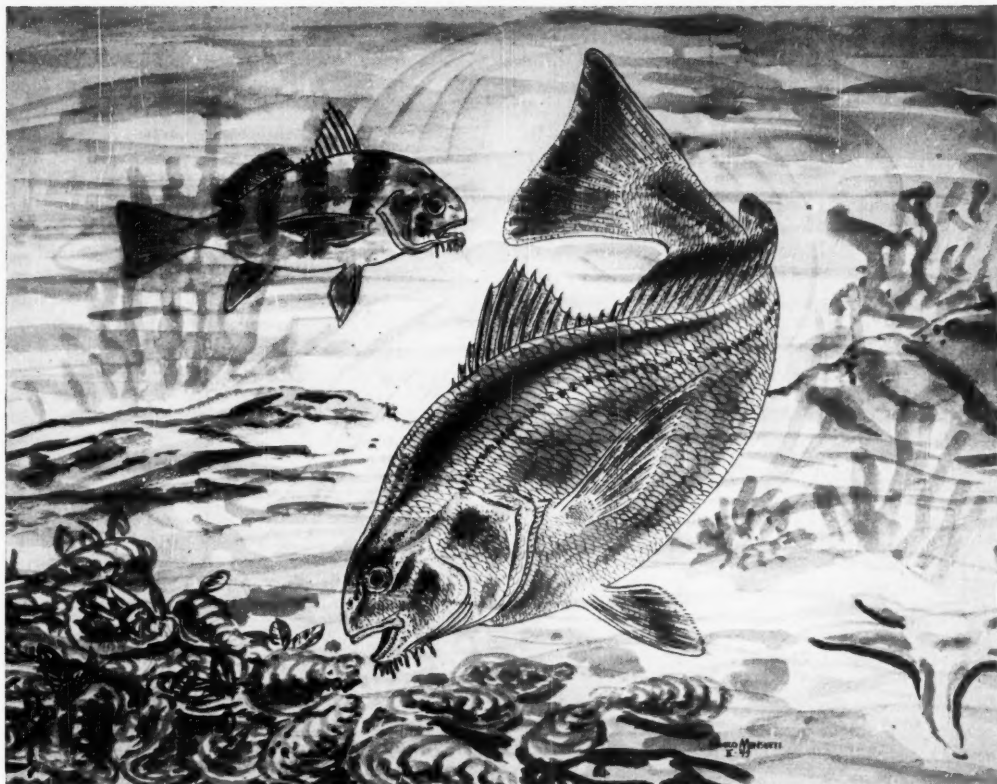
Of necessity taking the elk herd argument at its face value, representatives of Federal agencies recently met with Wyoming interests in an effort to knock down this latest dummy. In the meantime a series of studies has been made of the migratory habits of the elk as they come down from the mountains for the winter, and are fed on the Federal Elk Refuge or forage for themselves in the Jackson Hole region. These studies show that about 45 percent of the animals pass through some part of the Monument area, and thus enjoy its protection for varied periods of time. In years when the weather favors the hunters, many elk are killed by firing-line slaughter on Antelope Flat, where the shooting bears as much resemblance to sport shooting as potting at a bunch of massed cows.

So if there is any "crux" to this elk question it is the disinclination of the Wyoming Game and Fish Commission to deny its licensed gunners—local and non-resident—a chance for such slaughter, or otherwise to relinquish any control over the animals. Admittedly the Jackson Hole elk must be kept within reasonable bounds lest they starve. But shooting goes on in several regions of good sporting country outside the Monument, and even on the Federal refuge.

It is, of course, long-established public policy to exclude sport shooting from National Park areas. Anything that violates this policy is, in our opinion, fundamentally dangerous, and something to be resisted at all costs. We believe the Service would be unwise to show any disposition to temporize, even to the extent of allowing State-licensed gunners to shoot on the Monument as a method of control. If reduction in the elk numbers is demonstrated to be necessary in the interests of the animals, then it should be accomplished by systematic culling—as has been now and then necessary with other species—by Park employees and not in the name of sport.

It seems to us that the most sensible proposal made is for the creation of a Jackson Hole Elk Herd Advisory Committee, composed of the Commissioner of the Wyoming Game and Fish Commission, the Director of the National Park Service, the Director of the U. S. Fish and Wildlife Service, the Chief of the U. S. Forest Service, and a chairman appointed by the President and agreeable to the Governor of Wyoming. The Commission would have advisory but not mandatory function, would study the elk problem, possibly work out a permanent formula for control, and recommend reductions if they seem necessary. It would be left to the agency administering the lands from which the elk needed to be culled to do so by methods consistent with its policies.

We would like to see the Jackson Hole issue settled, and the Monument area take the place in our Park system to which it is richly entitled. But we do not care whether it is ever settled if it involves sacrifice of sound principles, or lends aid and comfort to those who lurk within the Trojan horse of exploitation.



The black sea drum, a bearded marine fish with a humpback, feeds on oysters and other sea-bottom invertebrates by crushing the shells with its powerful, pavement-like teeth. Texans aptly call it the "oyster cracker." Its unique drumming noises are produced by forcing air from the air bladder into one of the lateral horns.

Drums along the Atlantic

By ROMEO MANSUETI

Illustration by the Author

THE pale yellow moon cast an eerie glow over our launch as we lay anchored in Chesapeake Bay. In the distance, off our port bow, streaks of light heralded the approaching dawn. Our boat rocked gently against the soft breeze. Nearby, on deck, the box of sampling bottles clinked lightly together, reminding us that we must soon begin our collecting again. Only the soft lapping of wavelets against the boat's side revealed our watery station in the darkness.

Suddenly, an approaching noise—"wop, wop, wop,"—first gentle, then more resonant, struck our ears. Incredulously we peered out into the darkness, but the moon's illumination disclosed nothing. The noise gradually receded as our boat rocked from

our scuffling. Our captain snoozed comfortably.

We whispered excitedly among ourselves. Then the noise floated toward us again. My companion kicked the captain's foot and hissed, "What's zat?"

"Drums," he replied sleepily.

"What did you say?"

"Don't you know nothing. They're sea drums. You know, fish," was his weary reply.

Then it dawned on us. The sea drums, large, bewhiskered fish of the famed croaker family, had actually swum by below us on their way to better feeding grounds. In the distance we could faintly hear the soft, drum-like noises once again.

We carried on a hurried discussion about how and why the sea drum managed its Gene Krupa-like

sounds. In no time at all we became obsessed with the desire to see this unique species. The captain said he could satisfy this. "Ketchin' em is like eatin' orster stew!"

The next morning he entered the laboratory with a large, silvery-gray fish about 25 inches long. Its body was short and deep, and its back was much elevated. The outstanding feature was its beard-like appearance on the lower jaw. Looking closely we found its chin covered with many fleshy barbels.

So here was the black sea drum, *Pogonias cromis*, a piscatorial musician distributed along the coast from New England to the Rio Grande. The scientific name is a perfect fit. *Pogonias*, which means "bearded" in Greek, was the name selected by the French naturalist, Lacepede, while Linnaeus aptly called it *cromis*, which, in Greek, alludes to its grunting or croaking sound.

We pried the mouth open wide to see the large, lower cavity at the back of the mouth. It was armed with strong, pavement-like teeth. "Thet drum can sure make mince-meat out of orsters," the captain chuckled. Later we discovered that sea drums crushed the shells of other mollusks, crabs, and sea-bottom fauna with great ease, employing their facial ornaments to guide them and help them seek out food. Oystermen consider them a great pest in the South, where they are destructive to oyster-beds. In Texas they are appropriately dubbed "oyster crackers."

The black sea drum beats the band best during the breeding season. Then the males drum the loudest, while females respond somewhat more softly. Primarily intended to attract the opposite sex, the sound is believed to be produced by forcing air from the air bladder into one of the lateral horns.

Baron Georges Cuvier, the famed nineteenth century French ichthyologist, first demonstrated that the drumming was made by vibrations in the air bladder. Despite this evidence, based on careful anatomical dissections, Dr. John DeKay, the early New York State zoologist, in 1843 perpetuated the mistaken notion that the sound was produced by the strong compression of the expanded throat or pharyngeal teeth upon one another. Some of the sea drum's closest relatives, the croaker, mademoiselle, and the *Stellifer*, serenade each other by the latter method.

Dr. John Holbrook, the "father of American herpetology," devoted a great deal of his time trying

to solve the mystery, although he was aware of Cuvier's researches. He collected and examined many fishes from around Charleston, South Carolina. Finally, in 1867, he firmly declared, in the typical nineteenth century, long-winded style: "Frequent examinations of the structure and arrangement of the air bladder, as well as observations on living animals just taken from the water, when the sound is at intervals still continued, have satisfied me that it is made in the air bladder itself—that the vibrations are produced by the air being forced by strong muscular contractions through a narrow opening, from one large cavity, that of the air bladder, to another, that of the cavity of the lateral horn; and

if the hands be placed on the sides of the animal, vibrations will be felt in the lateral horn, corresponding with each sound." His investigations have not been disproved to this day. Dissections indicate that the drumming muscles are completely attached to, and confined to the swim bladder. Thus the fish actually produces a rapidly repeated series of grunts, which may be resonated by the swim bladder, and we translate them as drums.

Martin D. Buikenroad, a student of fishes of southern waters, has listened to the sea drum in Louisiana waters and concludes that they are excited to produce sound in response to stimuli in their natural environment. These are comparable with those supplied by man; therefore, this response, only in the special capture by man, becomes of no apparent adaptive value.

Despite its great abundance and well-known grunting, very little is known about the family life of the black sea drum. During the spring months they probably spawn in the inlets and bays of the Atlantic Coast; then the drumming contests are quite loud. Although many of our large fish shield no more secrets, such astute ichthyologists as Samuel F. Hildebrand and William C. Schroeder, in 1929, stated wearily that the eggs and larvae were undescribed. In fact the youngsters were just as rare. They reported: "Individuals less than 3 inches in length appear to be virtually unknown in collections." However, the Fish and Wildlife Service has recently studied the eggs and young of the black sea drum in Texas. There these fish move out into the Gulf, through the passes, from late February to May to spawn near the entrances. During the late summer and early fall there is believed to be a secondary spawning period when the younger (Continued on page 339)

Green Belief

By MAE WINKLER GOODMAN

The zinnias shrivel on their woody stalks;
The marigolds are smouldering pods of flame;
Where sweet alyssum hemmed the garden walks.
Only a few frail blossoms still remain.
Here must I come, to watch the last bees go
On their vain quest for pollen; the pale sun
Flickers dimly. Though sky withholds its snow,
Even the grass knows summer is past and gone.

Yet still the heart clings to its green belief,
Denying the white immanence of frost;
Only the heart will not accept the brief
Sweet season ended, and all its beauty lost;
Be solaced, heart; the winter, too, will pass;
Summer but sleeps beneath the shivering grass.



PHOTOGRAPH BY GEORGE STARKEY

Two Duluth junior high school boys with an injured red-tailed hawk, one of the wounded birds rescued from the annual slaughter on Davidson Hill each autumn.

Davidson Hill—Duluth's Conservation Challenge

By RAYMOND NADDY

ON THE western tip of Lake Superior lies Duluth, Minnesota. In almost the geographical center of this great shipping port is a wooded area known locally as Trap Woods. On the western edge of Trap Woods is a deep gorge running between two high ridges. Looking north, the ridge on the left is known as Davidson Hill, which is the site of one of the better-known natural hawk passes in Minnesota. The air currents along the ridge make an ideal flight lane for hawks and other migrating birds.

By local laws, and by laws of the State, Davidson Hill is a wildlife refuge. But, if it were not for the "No Hunting" signs, a person would never recognize this as such a place of refuge for our migrating birds. Dead hawks can be found behind almost every bush or clump of grass. Empty shotgun shells are almost as numerous as autumn leaves on the ground. In name, but certainly not in reality, Davidson Hill is a wildlife refuge.

Some time ago two turkey vultures tried crossing at the Hill. They came in low, slowly winging their way across the ridge. It was an inspiring sight to see these two birds flying so low. Most of those sitting in the blinds had never seen a turkey vulture, rare in this region, before. Nevertheless the shotgun barrels pointed upward, then paused, then

slowly swung ahead of the flying vultures. Finally, a broadside of leaden pellets and rifle slugs hit the two birds. The Hill riflemen seldom miss such shots as this, and they did not miss this time. Just a few days later, an American bald eagle—our National Bird and protected by law—came flying low through the pass. The guns on the hill, playing no favorites, opened up on it. Somewhat startled, the bird faltered, dropped about five or ten feet. Then, rallying, the magnificent eagle regained its dignity, rose like an elevator. Swift and sure of itself, the bird raced for the clouds, the deadly hum of rifle bullets singing around it.

Although the gunners on the hill place most emphasis on shooting the rarer birds passing over, the wholesale slaughter of more common species is large. For example, on Sunday, September 26, 1948, between 1:00 and 5:00 P.M., more than forty hawks were shot, predominantly sparrow hawks and young redtails.

Recently, at a meeting of the Duluth Audubon Society, it was said that the slaughter goes on, "because of ignorance and prejudice. Ignorance from the fact that those connected with the slaughter do not know the true value of the hawk, and thus do not appreciate the hawk, and therefore are prejudiced by this fact." This I doubt. Through years of shooting

on Davidson Hill, gunners have become greatly "interested" in the hawk, but only as a target. The majority of these men have mastered the difficult task of identifying the hawk species almost as soon as the birds fly into shooting range. And they know the value of these birds, for more than a half dozen of the younger men are students at the local university, either minoring or majoring in some form of conservation study. Yet the slaughter goes on every spring and autumn. The reason may be more or less hereditary, and the Hill area is just a short walk from the homes of most of those involved in the shooting. Also, the hunting season opens in Minnesota near the middle of October, while the hawk migration usually starts almost a month before. After being "dormant" all summer, the Davidson Hill riflemen are eager to turn out when the first big flight starts coming through. But when the legal hunting season opens in the State, the hill will be almost deserted on weekends, except when a clear, brisk day, with a strong west wind, brings down the large redbills and goshawks usually in late October. Then Davidson again bristles with guns.

There is a city ordinance prohibiting the assembling of firearms, including the firing of them, within the limits of Duluth. The city police department pleads a lack of men as the reason it cannot successfully patrol the Davidson Hill area. Once or twice yearly an adventurous policeman will traverse the woods to the Hill, rarely to apprehend an offender. The officer will take the gun—not the violator—to headquarters, where the serial number will be checked, and the weapon returned to the owner.

State laws, also, protect all hawks and owls, with

the exception of the goshawk, Cooper's hawk, sharp-shinned hawk, and the great horned owl. These laws are violated all during the migration. And state game wardens are almost as rare on Davidson Hill as the passenger pigeon. The wardens are, however, all too few, and must concentrate on enforcement outside of cities. So the duty of protecting hawks on the Hill is the duty of the city police department.

Wounded birds, used as decoys, are often seen in a miserable condition, with wings and legs shot off. Little or no thought is given to putting them out of their misery. School children roaming the woods have found several of these injured hawks, and those less seriously injured will often find refuge in the classroom of a science teacher at Washington Junior High School, an Audubon Society member. This classroom is virtually a living museum of wounded and injured birds, serving as examples of what thoughtlessness and lack of responsibility can cause. This teacher is giving students some knowledge of wildlife conservation, and is building up a conservation-minded group. Some day they may solve the Davidson Hill hawk problem, if any birds are left. In the meantime, the Audubon organization is responsible for such improvement as there has been in the reduction of the shooting on the Hill. Now the main problem is educating the public, in Duluth, Minnesota, and everywhere. Almost every State has places like Davidson Hill, sore spots of which no citizen can be proud. Only an aroused public will demand strict enforcement of their laws by their servants. Until there is such enforcement there will be no truth in the words "BIRD SANCTUARY" on Davidson Hill.

Any Old Scrap?

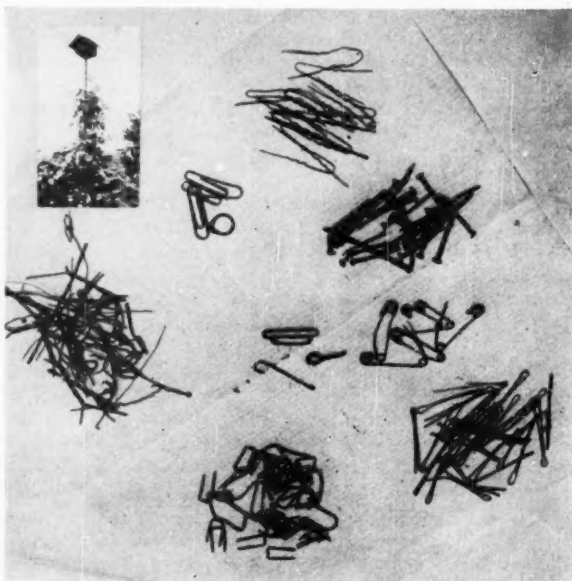
By MARGARET DRAKE ELLIOTT

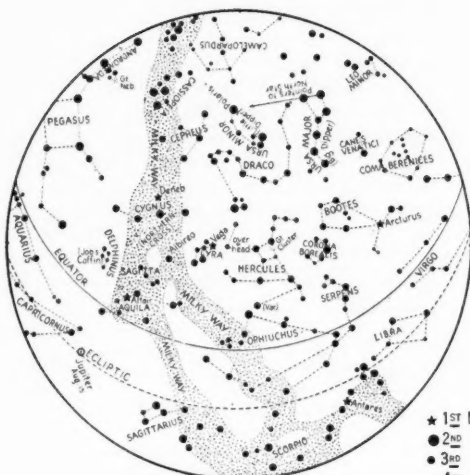
ONE wren house, twenty feet high on a gas pipe in the Quaintance garden at Muskegon, Michigan, will receive more than ordinary attention when its occupants leave, because last fall, when it was cleaned out, the contents shocked its landlady.

Minnie Quaintance remembers seeing a wren pop into the nesting box in the spring with a bright object in its beak. Came fall and the secret was out—156 pieces of metal, in addition to a minimum of conventional nest material, had gone into the construction job.

There were six safety pins, three open; four paper clips; 28 bobby pins; eleven hair pins; one garter slide; 27 small nails; one fishhook; one screw eye; 38 staples, and 39 miscellaneous pieces of wire.

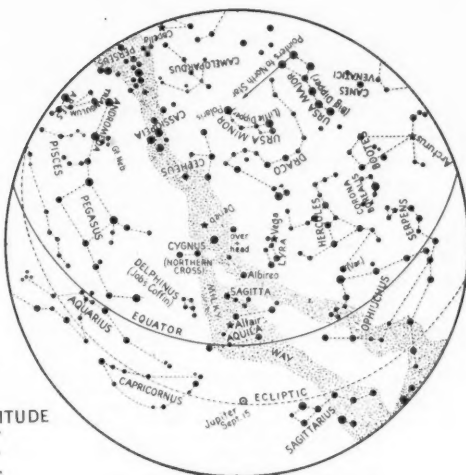
This strange assortment did not hinder the rearing of a healthy bird family. Mrs. Quaintance hopes the "metal-minded wren" is back.





9 P.M., Aug. 1; 8 P.M., Aug. 15

★ 1ST MAGNITUDE
 ● 2ND "
 ● 3RD "
 ● 4TH "
 ● 5TH "



9 P.M., Sept. 1; 8 P.M., Sept. 15;
 7 P.M., Sept. 30.

To use these maps hold them before you in a vertical position and turn until the direction of the compass that you wish to face is at the bottom. Then, below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

August and September Heavens

By ISABEL M. LEWIS

IN LATE summer and early fall, which is vacation time for many of us, there is much to interest those who wish to extend the list of constellations with which they have become acquainted. August is also the month when more than the usual number of meteors will be seen darting across the heavens. The Perseids are due, of course, to give their usual annual show, with maximum display August 10-12. A gibbous moon will be troublesome this year, blotting out the light of many of these swiftly darting little particles of cosmic dust as they are heated to incandescence through their encounter with our atmosphere. After midnight is the best time to look for them because their radiant, or the direction from which they appear to come, is in Perseus, which at that time rises near midnight.

The Perseids move in a wide stream in the orbit of Tuttle's Comet, which was discovered in 1862, and are so widely distributed around the orbit that the earth encounters members of the swarm for several weeks, although the greatest numbers are met on the dates given. Members of other swarms, The Cygnids and The Draconids, also appear in August, although in much fewer numbers, and they come from the general direction of constellations whose name they bear. The Cygnids move more slowly than the Perseids, while the Draconids are bright and move very

slowly. It will be interesting to try to distinguish members of these different swarms this month. The Cygnids are due to appear August 10-20, and The Draconids August 21-31. Swiftly moving meteors, such as The Perseids, are a brilliant blue-white but slowly moving ones such as The Draconids are reddish in color. Swiftly moving meteors are usually those that are met by the earth "head on," while the slowly moving ones are those that overtake the earth.

One of the finest constellations visible in the evening skies this month is the zodiacal constellation of Scorpio, or Scorpis, as it is also called. It is the most brilliant of all the twelve constellations of the Zodiac. One should not fail to include Scorpio in his list of known constellations. In the mid-latitudes of the northern hemisphere Scorpio always lies so low in the southern skies that it is not seen to the best advantage. In the tropics, where it rides high in the heavens, Scorpio is one of the most magnificent constellations visible at this time of year. The tail of The Scorpion is outlined by a long, curved line of brilliant stars which, in the latitude of New York, reaches nearly to the southern horizon. Antares, the brilliant, red, first-magnitude star that is in the heart of The Scorpion is a super-giant red star at a distance of about 170 light years from the earth. It is the largest of all known stars, with a diameter of 400,000,000

miles.

Sagittarius, The Archer, also a zodiacal constellation that lies directly east of Scorpio, is another constellation that every one should know. In the general direction of the vast star clouds of The Milky Way in Sagittarius, probably far beyond those visible to us, is located the center of our great galactic system, in which our sun, with its attendant planets, is but one among billions of stars. In Sagittarius, at the beginning of winter in our hemisphere, the sun reaches its farthest point south of the equator, the time at which summer also begins in the southern hemisphere. This constellation contains no first magnitude stars, only bright second and third magnitude stars in a very characteristic configuration, which includes a fine little dipper tipped toward the southern horizon. Jupiter is now in Sagittarius, adding greatly to its splendor.

The two zodiacal groups in the southern skies that follow Sagittarius on the east, are Capricornus, The Sea-Goat, which consists of a butterfly-shaped group of faint stars, and Aquarius, The Water-bearer, also formed of faint stars only. Difficult to observe in the atmospheric haze that often blots out the light of faint stars near the horizon, these constellations never appear far above the southern horizon in our latitudes.

It is at this time of year that the beautiful constellation of Cygnus, The Swan, whose brightest stars outline also the well-known Northern Cross, is observed to the best advantage. Lying along the path of the Milky Way, in one of its most brilliant regions, The Swan passes directly through the zenith in our latitudes in the evening hours of late summer and early fall. Deneb, at the top of the Northern Cross, is a star of first-magnitude, and at the foot is the beautiful third-magnitude double star, Albireo, whose blue and yellow components form a fine pair in the smallest telescopes. Directly to the west of Cygnus is the magnificent blue-white Vega, in Lyra, almost exactly equal in heavenly brightness to the beautiful orange-hued Arcturus in Bootes, which is now to be seen in the northwestern sky. Another fine constellation, also directly in the path of the Milky Way and to the southwest of Cygnus, is Aquila, The Flying Eagle, which has for its brightest star the first-magnitude star, Altair, easily identified by the two faint stars in line with it and at equal distances to either side of it. This constellation is noted for the fact that three brilliant novas have appeared in it. The

smallest of all constellations, Delphinus, The Dolphin, known also as Job's Coffin, is an interesting little, diamond-shaped group of fourth magnitude stars lying a few degrees northeast of Altair, near the edge of the Milky Way. Another small group is Sagitta, The Arrow, which will be found directly in the Milky Way north of Aquila and below the foot of the Northern Cross.

Near the end of August one will see, in somewhat isolated position near the southeastern horizon, rather late in the evening, below Aquarius, the brilliant white, first-magnitude star, Fomalhaut, in the constellation of Piscis Austrinus, The Southern Fish. This is the farthest south of all the first-magnitude stars that are visible in latitude 40 degrees North. Fomalhaut is visible for only a few hours each evening at this time of year, and disappears from the evening sky in December.

During the evening hours at this time of year one will observe that the constellation of Ursa Major, whose seven brightest stars outline that famous group known as the Big Dipper, is passing to the northwestern sky as the equally well-known W in Cassiopeia appears gradually higher in the northeastern sky on successive nights. These two constellations lie diametrically across the pole from each

other, and equally distant from it, so as one crosses the meridian above the pole the other is on the meridian below the pole nearly resting on the northern horizon in latitude 40 North. A third circumpolar constellation which everyone should be able to identify easily, is Draco, The Dragon, whose head, outlined by a group of four stars, one of second and three of third magnitude, lies beneath the foot of Hercules, who faces toward the north and now is an imposing figure in the western sky. Hercules is flanked on either side by a small but beautiful constellation, Corona on the west, and Lyra on the east. The tip of the tail of Draco lies on a line from The Pointers to the Pole-star, and from there the long curve of third and fourth magnitude stars, which outline the body of The Dragon, extends between the two Dippers and on below the Little Dipper in Ursa Minor to a point where it turns sharply toward Hercules. One sees in the two brightest stars in the head the eyes of the creature as it faces the giant Hercules.

Ursa Major, Ursa Minor, and Draco and Cassiopeia are all circumpolar constellations in our latitudes, and are always visible at some hour of the night since they never pass below the (Continued on page 339)

The Chickadee and I

By CHARLES EDGAR GILLIAM

The chickadee chirps clear and sure

In clefs that fit her throat;

Each tone exquisite is and pure

In theme and note—

Just Chick-a-dee!

But I am cruder far than birds;

For, when I strive to sing,

I drown in meter-harnessed words

Each perfect thing

Like Chick-a-dee!

Oh, for the gift to crystallize

The rich simplicity

Of rhythm in the woods and skies

In songs as free

As Chick-a-dee!

Camera Trails

By EDNA HOFFMAN EVANS

SINCE this is being written on a rather warm summer morning, and may be read on an equally warm day, I think a good cooling subject for the month will be ice-box photography. The name, so far as I know, is an invention of my own. The technique, on the other hand, has been used successfully by many Nature photographers.

When I first thought it over, the subject of ice-box photography seemed like an excellent one for hot weather. However, on second thought, I realize that only the subject stays cool. The photographer, alas, works just as hard and perspires just as freely as he does with any other kind of picture taking.

What is ice box photography? It is simple enough. All you need, plus the usual photographic paraphernalia, is an ice box—preferably an electric refrigerator, although an ordinary ice box will do. But enough of this beating around the ice box—what is the purpose of the whole thing?

Have you ever tried to photograph a lizard—whether it be a chameleon, horned toad, skink, race runner, iguana, or any other of the multitudinous members of the order *Squamata*—on a hot summer day? For that matter, have you ever tried to catch a lizard on a hot day? He is a pretty lively customer. There is not much chance that he will hold still and pose when you want him to. That is where the ice box comes in—and into the ice box goes the lizard.

As almost everyone knows, lizards and snakes are reptiles, along with alligators, crocodiles and turtles. Reptiles are cold-blooded vertebrates, their body temperatures being regulated by the coldness or warmth of the air around them. On cold days they are listless, sluggish, and barely able to move. Thus, on cold days, you rarely see any of them. They are hiding away



This collared lizard does not look chilly, even though he spent some time in the ice box before having his picture taken. This ice box method of cooling a reptilian model is one sure way of being sure they will "hold the pose" for a few minutes, anyway.

beneath old logs or tree bark, in burrows, under stones, or wherever they can find a secure refuge from enemies at times when they are unable to run and cannot escape in a more active manner.

Hot days, on the other hand, are the ones that fill our lizard friends with pep, vigor, and vitality. They can, and do, scamper about so fast that the eye can scarcely follow them. Warm weather affects snakes, too, and every hiker knows that he should step more carefully in snakey country on warm days. Of course, there is a limit to the amount of heat a reptile can take. Exposure to the direct rays of the summer sun would prove fatal if continued for very long. Reptiles sun themselves in the spring, while in summer they are more apt to be found in the shade under bushes, grass clumps, or just along the edges of logs.

Let us suppose you have captured a lizard and want to photograph him. I have done that frequently, and I have tried many techniques. For a long time I thought the glass aquarium method would produce good results, and I wasted a lot of film before I decided to experiment further. That is when I hit on the ice-box scheme.

My first subject was a collared lizard, one of those pretty, gray-green fellows with white-bordered black bands around their necks. They are native to the Southwest. I found this one quite by accident while turning over some stones in search of fish bait. Both the lizard and I were startled, and, in his surprise, he made for nearby Canyon Lake instead of for the rocky land. The water slowed him down, gave me time to regain my wits, and, before he could reach dry land again, I had him. So I took him home in the cardboard carton that originally housed my fish worms.

Any kind of a container—box, rectangular aquarium, round pyrex baking dish—proved to be unsatisfactory from the standpoint of photography. An edge or a corner always interfered, particularly since the lizard preferred the questionable shelter of a side rather than the exposed clear section in the center. I knew he would scamper away if he ever got free of his container. Several days passed—no photographs.

Finally, I popped him into a jar and placed the jar in the ice box. Then, while his ardor and enthusiasm cooled, I set up my stage—a real log on a table, with unwanted reflections cut by a strip of dark cloth. The background, a hedge of oleanders, was far enough away so that it had no effect on my close-up focus. I set the camera on the tripod, focused it carefully on one small portion of the log, noting the cracks in the bark that marked the clear-focus area. The exposure meter told me I could stop the lens well down, since I was using full sunlight, and I took a chance on 1/50 second exposure. That, of



"Fairy Penguins," by Leo A. Lyons of Port Kemble, Australia. From the Chicago Nature Photography Exhibition.

course, would be too slow to stop any movement if the lizard decided to run. But it was fast enough to eliminate any movement caused by the light afternoon breeze.

By that time Mr. Collared Lizard had been occupying the ice box for between a half and three-quarters of an hour. He was, I judged, cool enough. So I took him from the jar, placed him in the focused area, tripped the shutter, and popped him back in the jar in less time than it has taken to write this sentence. Back into the ice box he went, and I made preparations for another picture.

Things went equally well for the second picture, and back to the ice box my model went for another cooling spell. This time I decided to change things somewhat and to photograph him on the sunbaked earth rather than on a log.

But, as the saying goes, the third time was the charm, and the charm worked in reverse—for me. Possibly I had become too enthusiastic and, at the same time, careless. Probably I misjudged the third cooling period. At any rate, as soon as Mr. Lizard touched the warm earth he came to life and scurried away, taking refuge in the aforementioned oleander hedge, from which there was no hope of recapturing him. My collared lizard picture-taking session was at an end. But the first two pictures were well worth the time, effort and perspiration they entailed, and I sincerely hope the lizard has found his new home in the hedge as compatible as his old one on the shore of Canyon Lake.

Since that time I have tried the ice box technique with a number of reptilian subjects—with (Continued on page 337)



The School Page

By E. LAURENCE PALMER

Professor of Nature and Science Education, Cornell University, and Director of Nature Education, The American Nature Association

MICE IN SCHOOL

THERE are few schools in which mice may not be found, either with or without the assistance of the pupils. There are plenty of courses, in which the interest of the teacher, and of the pupils, varies greatly so far as mice are concerned. In spite of this, it is probable that mice could be the center of splendid lessons in science, Nature and conservation. White mice are frequently reared in cages for the purpose of studying genetic or nutritional relationships, but probably few teachers take time to call attention to the dramatic possibilities that exist in the age-long competition between mice and men for the plants that are of food value to each. There are few animals that may deserve and require greater measures of control, and that are more abundant, than mice. Yet schools generally seem more deliberately to avoid obvious lessons that are dramatically suggested by the mice.

All of us have some prejudices about mice. Some of these are sensible; some, foolish. All of us, at some time in our lives, may be threatened with diseases that we have learned to master because of experiments with mice. Rarely do we need to go far to find living material, since there probably are more wild mice in your neighborhood than there are of any other wild animal. The chances are excellent that the mice will influence the economy of your community more than will be the case with many of the animals that are almost universally studied in our schools. Certainly I believe dinosaurs are studied more frequently in the elementary grades, and it is obvious that these reptiles will never injure any of the crops we raise in our home state.

Examine the mice of your neighborhood. Do they all have tails of equal length, and do those with long tails prove to be better climbers than those with short tails? If mice are caught in traps in the homes of the pupils, are the same kind caught in summer and in winter? If traps are set in runways in the fields in summer, are the same kinds caught in swamps, woodlands and in dry fields? Of the mice trapped here, there and elsewhere do they all have proportionately equal-sized eyes, equal-sized ears, equal-sized hind legs? If you notice a variation in any of these, can you prove any differences in habits of the animals. For example, our deer-

mice have large eyes and large ears and are more active at night or in dark places. Why? Also our meadow-mice and deer-mice differ greatly in the color of their fur. What explanations seem to be reasonable in this connection?

Almost any simple wire cage may be made into the home of a mouse, which can be then kept for study in a classroom. Do the animals of a kind seem to live together harmoniously? Do mice of different kinds get along well together? Do some of them eat only vegetable foods that are offered to them, and do some eat only animal foods? Which, if any, of them will eat either plant or animal matter as food? Do any of them seem to store food that may be available for them, or do they simply eat food where it is and abandon it when their hunger may be satisfied? Which, if any, of the mice available for study seem to have model sanitary habits and tend to leave their droppings in a definite place outside the nest? Which, if any, have the habit of fouling their nests regularly? If water is put in a cage or cages where different kinds of mice are kept, do all of the mice react similarly to it? That is, do some avoid it while others seem to enjoy even swimming in it? If they are put in water, do they all try, with equal concern, to get out of it as quickly as possible? Do they all swim equally well?

Should you have to study your mice when they are dead, make a reasonable examination of their teeth to see how they differ. Are they all similarly colored on the tops and on the sides? Are they all equally smooth or grooved on their front faces? If you can examine the molars in the rear of their mouths, notice if the crowns of the different kinds are similarly roughened. The tables in the article on page 326 of this magazine should help you see why it is worthwhile to make these examinations.

The runways of mice through grasslands are always worth investigating. Sooner or later you will find a mouse nest if you follow some of these far enough. In winter, the snow above these nests may melt from the heat of the mice within, making a hole up through the snow, sometimes for a foot or more. If a mouse can be comfortably warm under a snow-bank in winter, is it likely to be pursued more during that season by birds of prey than is the case at other seasons? At what time of the year would a mouse living on the surface of the ground be most easily spotted by a hawk or owl? At what time in the year are hawks likely to be most abundant in your neighborhood? Is this fortunate or unfortunate for the mice—and for you? How could you justify hawk-shooting campaigns in the fact of the records we have of mice food habits, and at what time of the year should these campaigns be most vigorously opposed by anyone who likes a good meal that might be destroyed by the mice that the hawks might seek? These are but a few of the many questions we might ask children, their teachers and their parents about such common animals as the mice, animals that are almost wholly unappreciated. We hope that you can make a start in understanding them better from now on.

CAMERA TRAILS

(Continued from page 336)

chameleons, especially. It is interesting to watch their hides turn from dull brown to bright green after a session in the ice box. They really expand and enjoy themselves when the warm sun hits their chilled bodies. With snakes the technique is not quite so successful. A refrigerated snake will not assume a very graceful pose, nor will it stay in place for long after it is warm again.

The same method can be used with some insects. I have tried it with lubber grasshoppers and with beetles of various kinds.

Of course, it is necessary to use discretion along with refrigeration. One should never use the quick freeze chamber—the drop in temperature would be too sudden and would be too easy really to freeze the subject. Nor should the jar be placed in direct contact with the ice—that, too, might prove fatal. But a slow cooling that does not last too long (not overnight, for example) will do no harm to your subject. In fact, on a hot summer day, he may even be grateful for it.

NATURE CAMERA CLUB

H. J. Johnson, chairman of the Nature Camera Club of Chicago exhibition committee, has reported that entry forms for the club's fifth annual exhibit will be available in August, with deadline for prints on January 16. The exhibition will be held during the month of February in the Chicago Natural History Museum.

According to the club's bulletin, which is sent to exhibitors as well as to members, the fourth annual exhibition received more entries (2234 slides and prints) than had any of the previous ones, with a total of 216 prints and 510 slides accepted for display. Besides representing most of the United States, entries came from Argentina, Australia, South Africa, Canada, England, France, Holland, India, Italy, Alaska, Hawaii, and several other far corners of the globe.

Mr. Johnson sent "Camera Trails" an interesting selection of prints from the exhibit, and I only wish space permitted the inclusion of more of them. Note the representative that appears in this section.

Ever since I first read it, I have admired and applauded the Chicago club's motto-goal: "To make the naturalist a better photographer; to make the photographer a better naturalist." It is a star worth hitching one's camera to. I hope some Camera Trailsmen will be included in the 1950 display. For further information and entry forms write: H. J. Johnson, Chairman, 1614 W. Adams, Chicago 12, Illinois.

MISCELLANY

If you want another way of keeping up with what is available in the line of

camera equipment, drop a card to the Sterling-Howard Corporation, 1900 Monterey Avenue, New York 57, N. Y., and ask for their news letter, which lists many items of camera and darkroom equipment.

If it is filters you are thinking about, write the Tiffen Manufacturing Corporation, 71 Beekman Street, New York 7, N. Y., for information about their products for color and for black-and-white film.



Eastman's new Reliant

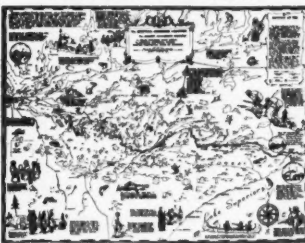
Eastman has recently issued what it calls its first completely new postwar motion picture camera, the Cine-Kodak Reliant, an 8mm roll loading camera for home movie makers. Its pre-focused, 13mm f/2.7 lens requires no adjustment for subject distance, while an auxiliary telephoto lens will provide 3x magnification. Portrait lenses, filters, and polarizers are also available for the camera. It can be operated at speeds varying from 16 to 48 frames per second.

Last, but by no means least from the standpoint of Nature photographers, Eastman has a new 16-page booklet on "How To Take Bird Pictures with Still and Movie Cameras." The booklet does what its title indicates, giving some very good pointers on the hows, wheres, and what-withs of bird photography. The booklet, which fits into the Kodak photographic notebook, will be sent free of charge to anyone requesting a copy from the Sales Service Division, Eastman Kodak Company, Rochester 4, New York. Be sure to mention "Camera Trails" when you write.

Bulbs by the Month

One of the interesting things about the Bulb of the Month Club is its seeming endless resource in digging up sources of bulbs in various parts of the world. Most recently the Club has been discovering the possibilities of Danish bulbs, and now offers five Danish imports, each bulb guaranteed to bloom within three weeks. Among these bulbs are lillies of the valley, which are kept in cold storage, and thus can blossom in most unseasonal fashion in the member's home. Full details about the Club may be obtained from it at 125 Madison, Chicago 3, Department N.U.

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DAY CAMPS FOR CHICAGO'S KIDS

By ROBERTS MANN
Superintendent of Conservation
Forest Preserve District of
Cook County, Illinois

IF YOU ever chased a bull around a straw stack, very soon the question arose: "Who is chasing who?" For several years we have been urging youth organizations to conduct day camps in our forest preserves. All of a sudden the idea took hold. Last summer (1948) we had to hire six extra naturalists and provided naturalist service for 19,882 boys and girls in day camps conducted by 64 youth organizations. This summer we are employing ten extra naturalists and there were 56 camps scheduled before April 1st. The ultimate total will be much greater.

In metropolitan areas such as Cook County, thousands of children are strangers to the outdoors. They do not know how to enjoy themselves there. What little knowledge they have of Nature is academic, colored by misinformation, or distorted by fear. But they have the two God-given attributes of childhood: they want to have fun; and they are avidly curious.

We believe day camps to be the only answer to the needs of these children who crave outdoor experiences. There never can be sufficient group-camping facilities, nor school field-trips, for more than a small fraction of them. Our 38,000 acres of preserves—80 percent wild land; 60 percent of it forested—lie in a great outer belt around Chicago. Adjacent to them are 95 suburban towns. The interiors support wildlife populations remarkable for their diversity and density. On the fringes are distributed 165 picnic centers heavily used on weekends and holidays but virtually unused on week days. Each contains every necessary facility for a day camp. All the day-camp organization must provide is transportation, the noon meals, well-planned appropriate programs and adequate trained leadership.

For every day camp which meets our standards we provide naturalist service on at least four days. The usual procedure is to take the children in successive groups of 30 or less—preferably less and preferably of comparable ages—on leisurely 45-minute walks through the woodlands, fields, and along the shores of streams, lakes, ponds or marshes. Nature games are employed to drive home what has been observed.

The emphasis is on life histories, ecology, and the relationships of species to each other and to man. Identification is unimportant; recognition is. Life histories are. Intimate sidelights on the growth, flowering, pollination, seed dispersal and possible uses of a plant by man or other animal, will help a child recognize that plant. If it interests him, sooner or later he'll find a way of remembering its name. If he doesn't, it's not important. Soil-plant-animal relationships help the child to recognize both plants and animals. The fundamental approach is somehow to interest each child in Nature; foster further exploration and DISCOVERY by the child; and show him or her how to have fun.

As you go along, not as a separate "lecture", you weave into your story the importance of good outdoor manners dictated by two basic concepts: friendliness and respect. Everything that grows, crawls, runs, swims or flies has its place in Nature and a function deserving of respect. Each has its niche. The sum of them all is THE LAND from which we came, upon which we depend, and to which we return. Open your eyes and get acquainted. Be friendly with all things. Fear nothing. Destroy nothing. When you leave an area, leave it just as it was when you came.

All this is taught by precept and subtle utilization of opportunities; not by preaching. Not by a jugful! But a day camp should be, among other things, a lesson in group living—out-of-doors. The experiences of the summer of 1948 demonstrated certain basic conclusions:

(a) The success of each day camp, the value of the naturalist's services, and the gain per child are directly proportional to the quality of the camp organization and leadership and to the training given the leaders.

(b) The value of a day camp is also proportional to the wild character of the area in which held.

(c) All camp activities, including crafts, games, dramatics and other projects, should have Nature significance and be related to experiences with the naturalist.

(d) Each child should have no less than four contacts with the naturalist—preferably many more. Four consecutive days in one week are apparently of more value than four days in four consecutive weeks. The naturalist makes a beginning; an introduction that must be well-rounded and inspirational—inciting the children to observe and explore and learn more. Showmanship replaces pedantry. Experiences are informal, intimate, and dramatic where occasion permits. There is no place for regimentation but discipline is essential for successful observation.

(e) A naturalist should not be assigned on a camp's opening day. That

time should be devoted to orientation and organization.

(f) Groups of very small children, and groups of underprivileged children from the "blighted" sections of Chicago, with little or no previous outdoor experience, have a short interest span. The first time or two, we take them on short walks, or let them paddle around the edges of a pond. Then we sit down to tell them stories, exhibit specimens, or play simple Nature games. Programs must be appropriate not only to the age level and outdoor experiences of the group, but also to the social situations from which the boys and girls have come.

(g) Nature games are invaluable as unobtrusive methods of reviewing and emphasizing what has been observed and taught.

(h) Notebooks, collections and individual projects should not be required but should be encouraged and aided if initiated by the individual.

Our Department of Conservation assists agencies in selecting suitable sites for day camps; conducts training courses for day camp directors, counselors and unit leaders; distributes printed handbooks and manuals for their use; assists them in planning nature programs; and allocates naturalists to serve them.

Our big job in day camp is to show city children how to enjoy themselves outdoors without engaging in city sports, indoor and playground crafts. Our day camp leaders will succeed if they make it FUN; brush away the cobwebs of fear and prejudice; tickle that bump of curiosity that every child has, and start him or her on the road to a richer fuller life.

Camp Fire Girls

Although designed, of course, for use by Camp Fire Girl leaders, the recently published booklet, "Our Land: Conservation Activities for Camp Fire Girls," contains many suggestions and references of value to any youth leader. Things-to-do suggestions, sources of materials and other helpful data are included. Copies are available from Camp Fire Girls, Inc., 16 East 48th St., New York 17, N. Y., at seventy-five cents.

Redwood Forest Plan

"An Action Program for the Redwood Forest of California" is the title of a pamphlet setting forth a proposal by Dewey Anderson, executive director of The Public Affairs Institute, 312 Pennsylvania Ave., S.E., Washington 3, D. C. and available from the Institute for twenty cents. In brief, the proposal is to create a corporation that would acquire the entire coast redwood forest, allocate some of it to park purposes and manage the remainder.

DRUMS ALONG THE ATLANTIC

(Continued from page 330)

fish breed. The baby drum enter inside waters soon after hatching, remaining there until they are about four inches long. A year old drum is about ten inches long; a five year fish, 23 inches. The fish spawn when about two years and annually thereafter. These investigators have discovered that a four-foot drum produces about six million eggs!

Black sea drums usually weigh from 25 to 50 pounds, but a gargantuan specimen taken in Florida weighed 146 pounds. Despite its large size it is not able to fight off infestations of parasites. Fishermen are quick to identify a "wormy" fish. None of these parasites are known to be injurious to man.

Young drums are just as bearded as their fathers; in fact, mother has a "beard" too. The youngsters, however, are silvery colored, with four or five vertical black bars. At one time they were considered different species; the banded drum was its name in many localities. Old drums are usually silvery black with a brassy luster. In the open Gulf of Mexico drums are often silvery; those in inshore waters are black.

Since the black sea drum is a large fish, its commercial possibilities have been exploited, but Americans are not passionately fond of its flesh, which is not too well flavored. In many coastal cities, nevertheless, it is relished when well prepared. At retail, the drum, which is marketed entirely as fresh fish, is sold in steaks at 5 to 10 cents a pound, the price not differing appreciably from that of 1900. Its value today is not sufficient to make shipping to distant markets profitable, despite modern refrigeration. The annual catch averages one to two million pounds, 50 to 80 percent of it in Texas.

Fishermen catch sea drums from April until December in pound nets. A small number are taken with hook and line, and a few with haul seines and gill nets. Occasionally a school of fish is entrapped in a haul seine, but this happens less frequently in bays than along the Atlantic Coast.

The black sea drum is a good sport fish, and some fishermen delight in fishing for large roe drums which are called "bulls." A rather large quantity of young drums are taken on light tackle.

The drum commands a wide audience along our eastern and southern seaboard, and were it not for its migratory pattern, we would certainly know its home life as well as we know certain of our native birds. Hundreds of thousands of drums have been captured by fishermen, but still many of the latter persist in saying, "There's the drums

again. I guess their mouths are shovelling up all the little fish in front of them." Most fishermen continue to be amazed at the tenacity for life that this fish exhibits long after it has been taken out of water, and beyond this superficial kind of an interest, fish dealers are not concerned with the critter. It will remain for the neo-mariner to discover the fish for himself, and perhaps follow up some particular aspect of the fish's life. Who knows, someone may even want to translate the language of the drumfishes, a task almost as difficult as deciphering the tom-tom drumbeats of African natives.

AUGUST AND SEPTEMBER HEAVENS

(Continued from page 334)

horizon in mid-latitudes of the northern hemisphere. They are easily identified with the aid of the star chart.

In August and September Mercury and Venus will both be poorly placed for observation. Mercury will be in the evening sky during this entire period, coming to eastern elongation on September 7, but it will then be within ten degrees of the western horizon and will be found with difficulty in the twilight. Venus also will be in the evening sky in both months, but it will not be more than about twelve degrees above the western horizon during the entire period. During both months Mars will be in the morning sky. It will be in Gemini, south of Castor and Pollux, in August, visible in the east for several hours before sunrise, and will pass from Gemini into Cancer at the end of August, where it will be found throughout September, high in the eastern sky at sunrise.

Jupiter will be seen in the southeast in Sagittarius soon after sunset, a magnificent object, surpassed in splendor only by the moon and Venus. Venus will be visible only for a short period after sunset. In September Jupiter will be high in the southeast at sunset and will set before midnight.

Saturn remains in Leo throughout these two months and is close to the sun in August, coming into conjunction with it on September 2, when it passes to the morning sky. It will not be visible in the morning sky until near the end of September.

San Diego Reptiles

With few changes, "The Snakes of San Diego County with Descriptions and Key" by C. B. Perkins, has been brought out in a second edition by the Zoological Society of San Diego. Following the key to identification, descriptions and pictures of the various species are presented.

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BURBANK LOVED MANKIND

(Continued from page 311)

this experience:

"One day, I was walking beside a long row of Shasta daisy plants. Each plant in that row was a new variety. I suddenly saw blossoms on one plant that were whiter than all the rest. It was the whiteness I had been seeking for years.

"To my eyes, that difference in the whiteness of the flowers on that plant and the blooms on all the others was so great that it would not have been any more conspicuous to me if the flowers had been bright red or black.

"I wondered whether other people would notice the difference in the shade of whiteness. So I led my workmen, one at a time, past the white blossoms and asked them if they saw one set of blossoms that were whiter than the others. Not one could tell the difference.

"Following that, I tried the same experiment with several people who were visiting me. It was not until a lady artist from San Francisco was walking through the garden with me one day that I found a person who could distinguish the shade. To her, the white blossoms on that one plant were as much different from the others as they were to me. Apparently, her color sense and mine were similarly developed."

Later that morning, Burbank pointed to new varieties of dahlias that he was examining, and showed me how the shades were quite distinctly different. I saw scarcely a single plant in that whole acre of new varieties that I would have been willing to discard if they had been mine. But he pointed out the undesirability of the slight difference in shade of color, or some other characteristic that caused him to discard almost all of the varieties on that half acre of ground.

He told me of a test for his sense of smell that occurred a few years before. He had an acre of seedling callas. Each plant in that acre was a new variety. He was hoping to find one with a pleasant odor.

"One evening," Burbank related, "when I was walking through that acre of callas, an odor came to my nostrils that was just what I had imagined would please other people if they smelled it in a calla blossom. My sense of smell did not lead me directly to that one flower, but I could distinguish the odor, and I was sure that it came from one of those blossoms. I got down on my hands and knees and started at one corner of that acre of calla blossoms and smelled each blossom until I came to the one for which I had been searching. It was later introduced as the *Fragrance calla*."

Because of my experience with this great man, I feel that these components of his personality took first rank in the

production of the new plants he introduced. In fact, these numerous introductions, and their tremendous value to mankind, were made possible because of those personal characteristics. Whether his intimate contact with Nature developed these character traits, or whether they were inborn is difficult to determine. At any rate, Luther Burbank was not only the world's most versatile plant improver, but he was the most inspiring character I have ever known.

OUR SWANS TRUMPET GOOD NEWS

(Continued from page 318)

thing had happened to one youngster.

"These natural casualties," we told ourselves sensibly, "were bound to occur." Nevertheless we worried, and the very next day, we had a phone call. "One of the baby swans," cried an unfamiliar voice, "is in the water at the highway bridge. It must have gotten through a hole in the fence."

Thus the town of Jackson and the valley people were becoming concerned and proprietary towards these young wildlife residents. This was good. We needed co-workers and sympathizers.

The very thing we feared had happened! Those highway, publicity-seeking swans, just had to show off their brood to travelers. Using a rubber boat, we rescued the infant and restored him to his parents. But somehow, they ignored him. Although he tried feebly to trail along with them as they swam upstream, they were indifferent to his weak calls. The next day that cygnet was gone. It seemed definitely now a case of Nature's law, survival of the fittest.

Meanwhile the other pair of trumpeters, who had shunned the public eye, had brought off a brood of three. This family lived far up the creek. Within one week they, too, had suffered natural casualties. Two of the young had disappeared.

"However, four new additions to our flock is significant," we told each other philosophically. But it proved, also, how great are natural casualties among wild species, even when given maximum protection.

Throughout the summer, which faded early into a September of golden-leaved aspens, brown slopes, and hot dry winds, our flock of prized youngsters grew. Each evening the "Highway Couple" paraded their family down to the bridge near the road. One dusk two of the cygnets came very close to us. We could see their gray pinion feathers, their pinkish bills edged in black and their greenish-tinted legs. They were strong, and about half the size of their snow-white parents. Although the cygnets could not fly yet, they could easily be mistaken for Canada geese in size and color. This suggested another hazard that

would face them when the hunting season opened.

Days were growing shorter; nights colder and bright with stars. Field flowers drooped frost-bitten heads. Although snow had not yet come down the mountain slopes, the peaks were coated in white. Elk, moose, deer and mountain sheep began drifting from their summer ranges in the high country to the valley. The roads were clogged with cattle, and the air with their bawlings, as cowboys herded them from one range to another, or to market. At nights we could hear the coyotes barking, and the great horned owl that had taken up its roost on our flagpole hooted a melancholy obligato.

Ice covered the edges of the ponds and everyone was talking about an early winter, that cloudy November morning, when our flock, young and old, arose from the creek, circled slowly overhead, then turned for an exploratory flight towards the Yellowstone.

I watched them out of sight from the living room window. I felt no loss at their leave-taking, for they would come back. This creek, this mountain valley, was again their established home.

In times past, when the red man, then the first white man, and the outlaw, and the homesteader, had traveled over the Pass of the Tetons on horseback and by wagon to this valley of the Snake River, flocks of trumpeter swans were a natural part of the landscape. Then, when civilization usurped the birds' nesting sites, took their eggs and killed their young for food, this great, white waterfowl had left, it seemed forever.

But now, we hoped, our swans would come back to protection, to security, and to food. With that thought, I turned from the window to the room with its cheerful fire, the wild trumpet notes of our symbolic flock echoing good news of survival.

Biological Photographers

The Nineteenth Annual Meeting of the Biological Photographic Association will be held September 7 to 10 at the Hotel Cleveland, Cleveland, Ohio. There will be a salon and commercial exhibits. Further information about this organization and the meeting may be obtained from Mr. David Lubin, 130 Keats Lane, Berea, Ohio.

Mrs. Edge Honored

In recognition of her signal contributions to conservation, Mrs. C. N. Edge, chairman of the Emergency Conservation Committee, has been awarded the honorary degree of Litt.D by Wagner College, Staten Island, New York. The award was made by Dr. Walter Consuelo Langsam, president of the college, at the June commencement exercises.

THE READER'S MARKET

A place where members of the American Nature Association and readers of Nature Magazine may find many interesting offerings or may advertise themselves, at low cost, for things wanted; things they have for Sale, for Trade, for Sale or Trade. This is an excellent forum for acquiring or disposing of such items as binoculars, books, cameras and photographic equipment, magazines, sports and outdoor equipment, etc.

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Under the Microscope

By JULIAN D. CORRINGTON

THE MICROSCOPE MAKERS

V. Charles A. Spencer

THE founder of that celebrated firm destined to be known as the Spencer Lens Company, today the Scientific Instrument Division of the American Optical Company, was America's first microscope maker. Unrecognized, until later, in scientific circles in Europe, this "backwoodsman" from the wild and woolly regions of central New York State not only dared question certain entrenched theories of the day, but also made the best objectives yet seen. He ran away with numerous first prizes and gold medals, to the consternation of all regularly sanctioned manufacturers.

Charles A. Spencer was born on Quality Hill in the town of Lennox, New York, in 1813, the youngest son of General Ichabod Spencer, a member of a well-known and highly esteemed family. One of his uncles was Judge Joshua Spencer of Utica, and another was Dr. Thomas Spencer, professor in the old Geneva Medical College. Charles was educated at the Cazenovia Academy, attended Geneva College (later Hobart) for a year, then transferred to Hamilton College at Clinton, of which his uncle Joshua was a trustee. But the sort of training he wished was not to be obtained in the colleges of his day, and he was, furthermore, disinclined to remain as a "charity student," as he expressed it, so he withdrew without ever completing his formal education. Later he was to receive an honorary A.M. from Hamilton.

Removing to Canastota and continuing his studies in practical science, leavened with classical literature, we find him cropping up with a circular, about the year 1838, announcing himself as a manufacturer of telescopes and microscopes. We owe such information as is available on the early life of Spencer chiefly to the memoir published by Dr. Hamilton Smith in 1882, in the *Proceedings of the Society of Microscopists*, for a disastrous fire in 1873 destroyed all earlier papers and letters. In this memoir appear some prices that make interesting comparisons with those now current. A catalog that Spencer issued about 1840 describes "Optical, Philosophical, Mathematical, Chemical and other instruments and apparatus," and quotes reflecting telescopes, 3- to 10-inch apertures, from \$8 to \$75, and achromatics of 1- to 3-inch at \$12 to \$200. Both reflecting and compound achromatic (refracting) microscopes are listed, with accessories and numerous test objects. A large number of other instruments for many scientific purposes are likewise included.

His biographer expresses the opinion that the business was not profitable because Spencer was too much of a genius for his own good, and, like many another gifted person, not sufficiently practical concerning money. Orders would pile up while Spencer experimented, always striving for a better product, never being able to catch up with demand but neglecting profitable business for the vision of perfection. Indeed, he had stated, earlier, that he would never work with his hands to make an instrument for sale!

Visiting Dr. C. R. Gilman, professor at the College of Physicians and Surgeons (later a part of Columbia University) in New York City in 1847, Spencer was shown an achromatic microscope made by Chevalier in Paris. Remarking that he thought he could make a better one, Spencer was commissioned by the doctor to do so. Later, with the finished instrument, Spencer stopped at West Point to show it to Professor J. W. Bailey; also he wished to see some of the

diatom test objects he had heard Bailey used. The professor published a glowing account of this microscope, stating that Spencer's objectives were far superior to those of Chevalier, the equal of Oberhauser's, but not quite as good as the products of the celebrated British manufacturers, Ross and Powell. This made Spencer famous overnight, but also gave him something to shoot at.

The following year Spencer made an objective for Professor Bailey that resolved the markings on a diatom that constituted a far more difficult test object than others then in vogue, and the scientist accordingly named the new subject *Navicula spencerii*. Gradually Spencer lenses crept ahead. Soon the news trickled through European scientific circles that a Yankee "backwoodsman" was making objectives that could resolve objects no European instruments could touch. This was, indeed, a scientific bombshell.

As the years passed, Spencer continually improved his workmanship. He computed ever wider angles of aperture and possessed an uncanny skill in figuring chromatic corrections to accompany increased angle, a difficult feat. Ross, probably the greatest English maker, is said to have remarked that Spencer must have some method of working with glass that was unknown to other opticians. At the height of his career as a microscope maker, in 1850, Spencer attained an angle of aperture of $174\frac{1}{2}^\circ$, whereas the best then reached by Ross was 135° . Smith tells us that one of Spencer's qualities that brought about such marked success was his willingness to experiment for almost two years to perfect a certain objective, meanwhile refusing to sell any of them.

By the period around 1855 Spencer objectives were considered by many as the best in the world. Meanwhile others were working with him. Early microscopes were engraved "Charles A. & H. Spencer," the latter being Hamilton Spencer, a cousin. Robert B. Tolles, another famous microscope maker, whose career will feature our next installment in this series, joined Charles Spencer as an apprentice in 1843 and remained in his employ until 1858. During the 40's and early 50's the firm seems to have been known as Messrs. Charles A. Spencer & Co. About 1854, a partnership was formed with Professor A. K. Eaton, of Troy, and the name became Spencer & Eaton.

These men, with their assistants, made many kinds of instruments, including telescopes, a subject that always interested Spencer. In 1865 they completed the large, equatorial $13\frac{1}{2}$ -inch refractor for Hamilton College, the largest telescope in the country at that time. The contract price for this 16-foot-focal-length instrument was \$10,000 and its performance is said to have "compared favorably with the best Munich glasses." In preparation for another large contract, Spencer went to Europe to visit renowned workshops and laboratories and observatories, and took advantage of this opportunity to meet many important personages of the scientific world.

Dissolving partnership with Eaton, the concern became known as Charles A. Spencer and Sons. These were Herbert R., who specialized in lens-making, and Clarence, who worked on the stands. A son-in-law, O. T. May, made objective mounts. By 1873 this company had a worldwide reputation. In that year disaster struck in the form of a fire that ravaged nearly all the shops of the village of Canastota, Spencer losing practically all tools and machinery as well as large stocks of both finished and unfinished products.

Starting up again in a barn, the business continued until 1875, when it was removed to Geneva—initiating a trend westward that was to continue later—becoming associated with the Geneva Optical Works for two years. Thereafter the establishment was conducted under the name of C. A. Spencer & Sons until 1880. At the Paris Exposition of 1878, Professor Barnard, of Columbia, one of the United States Commissioners to this Exposition, entered some Spencer objectives, without the knowledge of their maker, and these won the

highest award, a magnificent gold medal.

In 1880 the son, Herbert R. Spencer, entered business for himself in Geneva, the father continuing in the old shop. After a short illness, Charles A. Spencer passed away a year later, in 1881, at the age of 68. Thus came to a close a long and highly useful career, a life devoted to the ideal of perfection. The name of Charles A. Spencer will live on, honored in any account of the development of science in America.



CHARLES A. SPENCER

In subsequent articles we shall continue a historical survey of the Spencer Lens Company. We are much indebted to the Company for information and assistance, to Dr. Smith's fine Memoir, to papers by William C. Krauss and Ken G. Niblack, and to many others, some of which can be acknowledged further in later chapters.

NO-PRIZE CONTEST

In these days of innumerable contests, chiefly via radio, whereby one acquires all of life's needs through the difficult mental feat of recalling that Washington's first name was George, we find ourselves at a great disadvantage. Alas, we cannot afford to send you an electron microscope for telling us the name of the eyepiece at the upper end of a microscope tube; so, making a virtue out of such sad adversity, we have decided upon the startling original course of running a no-prize contest!

In the Middle Ages much exactness was required in the application of collective nouns to social animals. Thus, it was an unpardonable sin to speak of a flock of quail, rather than a *bevy*. Everyone knows that wolves travel in *packs*, but not many persons today are cognizant of the meaning of a *pride* of lions. Does a number of geese constitute a flock, herd, drove, covey, or school? Often there is sense to what seems at first mere caprice. A *drove*, for example, is a group that is *driven*, as swine.

But what about the microscopic animals? Shall their hordes go nameless simply because they were unknown to Queen Guinevere? Od's bodikins, no! The exactness required by modern science has rendered imperative the introduction of new terms for animals not formerly known. Let us have group names for *Stentor*, *Paramecium*, and *Vorticella*; adopt distinctive appellations for the gang in the cases of *Hydra*, *Gonionemus*, and *Planaria*; and be able to refer specifically to a goodly company of *Ascaris*, *Lumbricus*, and *Unio*.

Would it be better to have an *amble* of amoebas, or is it possible that these creatures travel in a *glutch*? You have seen a crew of cheese mites, but who has named them? Let us have your nominations by postcard, addressed to Dr. Julian D. Corrinton, NATURE MAGAZINE, 1214 Sixteenth St., N.W., Washington 6, D. C. No cards returned or acknowledged, and no prizes, but the best suggestions will be published.



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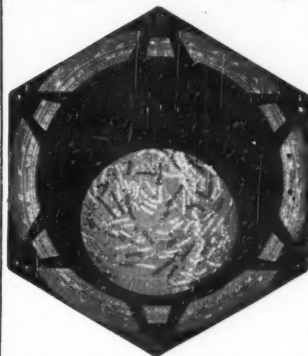
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by means of a large set screw, releasing the condenser lens for cleaning when necessary. Two spring clips are provided.

The coarse adjustment operates by rack and pinion, the fine adjustment by a cam that shifts the approximate focus up or down a trifle so as to sharpen the image when using the higher powers. These operate in two separate dovetail guides and each has two adjustment knobs, one on each side. The nosepiece is triple; the tube length is the standard 160 mm., and optical parts are interchangeable with those of all standard makes, so that other eyepieces and objectives can be used with this stand.

The ocular provided is a 12X Huygenian. Either or both 8x and 16X may be ordered extra, or specified as a substitute. The three objectives are as follows:

Objective	EF. mm.	Draw Tube	Initial X	Final X
Low power	16	in	9.2	110
		out	12.25	147
Medium power	8	in	19	228
		out	26	312
High power	4	in	45	540
		out	60	720

Final magnifications given above are those obtained with the 12X eyepiece. The 4 mm. objective contains two achromats and a hemisphere; it rates [0.725 N.A.]. The 8 mm. objective has two achromats, and the 16 mm. one. The images provided by these optical parts are excellent. The definition is sharp, the image bright. When tried out on a wide variety of protozoan, botanical, and histological slides, the resolution and definition proved entirely adequate.

A wooden carrying case, fabrikind-covered, with hasp, handle, and a small tray for slides and accessories is available. Price, microscope, \$89.00; case, \$8.50 extra. Testa microscopes may be obtained from numerous dealers throughout the country.

TRADE NOTES

Cytology

Three distinctive features of *General Cytology* are the very modern content, small size, and the fact that this work appeared first in Spanish. The authors are Drs. Eduardo D. P. De Robertis, M. I. T., W. W. Nowinski, University of Texas Medical School, and Francisco A. Saez, Institute for the Investigation of Biological Sciences, Montevideo. The English translation is by Dr. Warren Andrew, George Washington University Medical School.

One thinks of voluminous classical works in this field and is surprised at the small size of the new text, and, further, that it contains so vast an amount of information totally unknown when Wilson wrote *The Cell*. There is much more chemistry than heretofore; not only the microscopic but also the submicroscopic

structure is thoroughly explored; the nucleus and chromosomes, mitosis and meiosis, come in for the expected treatment, but much greater attention is now paid to the cytoplasm and its organelles. Cytogenetics, enzymes and respiration, plasma membrane and permeability, the "resting" nucleus, visible manifestations of cellular activity, and the differentiation, senescence, and death of the cell are further major topics. The illustrations are nearly all new and include the casual and unheralded insertion of several in color, a rare phenomenon these days.

This work is not merely a translation, but a complete revision, with new material and 34 new illustrations. Chief interest is necessarily the cell in all of its parts and aspects, but a secondary one of an almost spectacular science-reader-appeal is the explanation as to how these often abstruse modern findings have been made. Taken up as minor information under the section where each is used as an important tool are discussions of the electron microscope and the shadow-casting of electron micrographs, absorption microspectrophotometry, X-ray diffraction, polarization microscopy, fixation by freezing-drying, and the information obtained from darkfield, centrifuge, fluorescence, ultraviolet, and phase-contrast microscopy and from the micromanipulation apparatus and tissue-culture technique and still other instruments and methods. Each chapter concludes with numerous references. To our knowledge this is much the most modern and comprehensive survey of cytology, indispensable for those interested in this field. Pp. xi, 345; figs. 143, 3 in color. W. B. Saunders Co., West Washington Square, Philadelphia 5, 1948. \$5.50.

General Science

Often has it been said by the layman that scientific progress has been so rapid and far-reaching that it was time to pause and take stock. The pause is not possible, but the stock-taking has been done at the George Westinghouse Centennial Forum, held at Pittsburgh in May, 1946. Three small, handsome volumes, boxed as a set, contain the 36 papers and commentaries made at this occasion by 33 distinguished specialists.

It is not possible to list all of the titles in a brief review, but some samples are: *The Social Composition of Scientific Power*, Isaiah Bowman; *Planning in Science*, Vannevar Bush; *Atomic Energy for Power*, Enrico Fermi; *The New American Way of Life*, Charles F. Kettering; *Horizons in Communications*, Frank B. Jewett; *Peacetime Implications of Biological Warfare*, George W. Merck; *Scientific Progress—Insurance Against Aggression and Depression*, Karl T. Compton. Titles run the gamut from astronomy, microbiology, transportation, electricity, chemistry, photosynthesis, and the atom to the sociological implications of these and

many more phases of present civilization.

The set has the general title *Science and Life in the World* and brings together the results of the enormous research in all fields of science that accompanied World War II, as well as opinions as to the impacts of these inventions and discoveries on our civilization. The papers are nontechnical, written for public addresses, and constitute excellent summaries. Vol. I, *Science and Civilization and The Future of Atomic Energy*, pp. ix, 152, 9 portraits, 2 figs.; II, *Transportation—A Measurement of Civilization and Light, Life, and Man*, pp. ix, 236, 11 portraits, 2 figs.; III, *A Challenge to the World*, pp. ix, 198, 13 portraits, 29 figs. Whittlesey House, McGraw-Hill Book Co., Inc., 330 W. 42d St., N. Y. 18, 1946. \$2.50 each volume; boxed set of the three, \$7.50.

Entomology

By the present time we are quite accustomed to the manner in which physicists and chemists have taken over numerous fields in biology, requiring interpretations of structure and function at the molecular or atomic levels, but an entomological work by a physicist? Well!—After all!—However, perusal of *The Songs of Insects*, by Dr. George W. Pierce, explains why it took a professor emeritus of physics and of communication engineering (Harvard) to write it. Dr. Pierce is a prominent writer and inventor, a former president and medalist of the Institute of Radio Engineers, and a recipient of the Franklin Medal of the Franklin Institute. A research specialist in acoustics, he developed or adapted the apparatus necessary to receive sound vibrations of insects and to study and analyze them by amplification and photographic recording as sound records. The stridulating mechanisms of a number of insects are described, the apparatus and methods explained, then follow three chapters analyzing the sound records of crickets, two on katydids, one for locusts, one on cicadas, and one for comparative purposes on a few birds and bats. Many attractive photographs add to the layman's enjoyment and understanding of the work, much of which is technical and statistical. There is no index. The methods and results will appeal to entomologists, and to acoustic and electronic engineers and students of all of these subjects. Pp. vii, 329 figs., colored frontisp., 243. Harvard Univ. Press, Cambridge 38, Mass., 1948. \$5.00.

Repairman

Microfans residing in the southeastern quarter of America the Beautiful will be interested in learning that we have come across a reference to a man who makes his business the repair of optical instruments, including microscopes. He has been highly recommended by factory officials. He is Bernard H. Yates, Room 901 William-Oliver Bldg., Atlanta, Ga., phone WA 4932.

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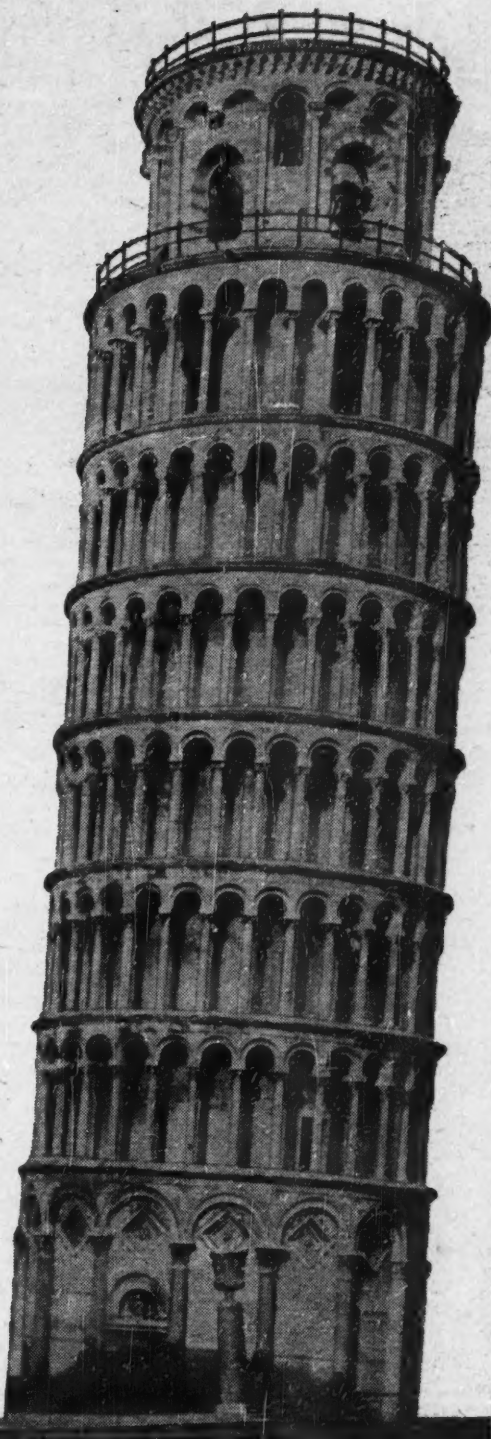
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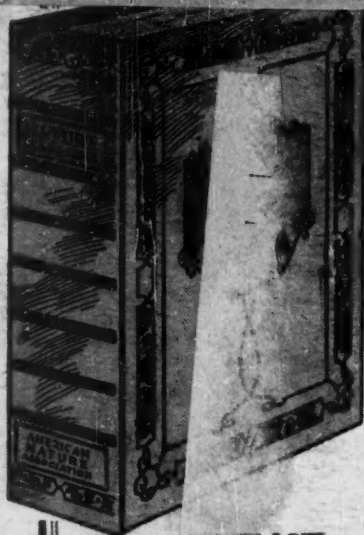
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